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Milford Contaminated Aquifer Superfund Site

Milford, Clermont County, Ohio

Record of Decision

U.S. Environmental Protection Agency Region 5

77 W. Jackson Blvd.
Chicago, IL 60604

April 2022

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Milford, Ohio

This Record of Decision (ROD) documents the remedy selected for the Milford Contaminated Aquifer Site ("Site" or "Milford Site") in Milford, Clermont County, Ohio. This ROD selects a final remedy for groundwater contamination present at the Site. The ROD is organized in three sections: Part I contains the *Declaration* for the ROD, Part II contains the *Decision Summary*, and Part III contains the *Responsiveness Summary*.

PART I – DECLARATION

This section summarizes the information presented in the ROD and includes the authorizing signature of the United States Environmental Protection Agency (EPA) Region 5 Superfund & Emergency Management Division Director.

1.1 - Site Name and Location

Milford Contaminated Aquifer
CERCLIS ID# OHSFN0507973
Milford, Clermont County, Ohio

1.2 - Statement of Basis and Purpose

This decision document presents the Selected Remedy for the Milford Site in Milford, Clermont County, Ohio. The remedy was developed in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Specifically, this decision document has been prepared in compliance with CERCLA Section 117 and NCP Section 300.430(f). This decision document explains the factual and legal basis for selecting the remedy for the Site. This decision is based on the Administrative Record file for the Site. The Administrative Record file is available for review online at www.epa.gov/superfund/milford-aquifer and at the following locations:

Site information repository
Clermont County Public Library
Milford Miami Township Branch
5920 Buckwheat Road
Milford, Ohio 45150
513-732-2736

EPA Region 5 Records Center
77 West Jackson Boulevard
Chicago, IL 60604
312-353-1063
(call for appointment)

The State of Ohio has concurred with the Selected Remedy. The State's concurrence letter is provided in Attachment 4 and has been added to the Administrative Record.

1.3 - Assessment of Site

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

1.4 - Description of Selected Remedy

EPA's Selected Remedy addresses the groundwater contamination present at the Milford Site by in situ treatment (with reagents – combined approach) of the contaminated groundwater and soil contributing to groundwater contamination. EPA has not identified any principal threat wastes at the Site. The major components of the Selected Remedy for the Milford Site include the following:

- Injection of a reagent (to be determined) into the subsurface to treat contamination present in the soil and groundwater at the source area (Baker Feed property);
- Installation of a permeable reactive barrier (PRB) downgradient of the source area to further treat contaminated groundwater;
- Implementing and maintaining institutional controls (ICs) to prevent use of contaminated groundwater;
- Verification that properties within and near the plume are connected to the existing municipal water supply;
- Implementing engineering controls (such as signs, fencing, etc.) necessary to protect public safety during construction and, if applicable, operation of the remedy;
- A pre-design investigation with the objective of better characterizing the source area and providing information necessary to complete the remedial design;
- Groundwater monitoring to evaluate the impact of the selected remedial action and to ensure that cleanup levels downgradient of the source area are being met. In the meantime, groundwater above the PCE cleanup level that travels to the municipal wellfield will be captured and treated by the existing air stripper.

1.5 - Statutory Determinations

The Selected Remedy is protective of human health and the environment, complies with federal and state applicable or relevant and appropriate requirements (ARARs) (unless justified by a waiver), is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).

While this alternative would ultimately result in reduction of contaminant levels in groundwater such that levels would allow for unlimited use and unrestricted exposure, it may take longer than five years to achieve these levels. As a result, in accordance with CERCLA, this selected remedy is to be reviewed at least once every five years until remediation goals are achieved and unrestricted use is achieved.

1.6 - Data Certification Checklist

The following information is included in the *Decision Summary* section of this ROD. Additional information can be found in the Administrative Record file for this Site.

Information Item	Section(s) in ROD
Contaminants of concern (COCs) and their respective concentrations	Sections 2.1, 2.5.1, and 2.5.4
Baseline risk represented by the COCs	Section 2.7
Cleanup levels established for the COCs and the basis for these levels	Section 2.12.4
How source materials constituting principal threats are addressed	Section 2.11
Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD	Sections 2.6 and 2.12.4
Potential land and groundwater use that will be available at the Site as a result of the Selected Remedy	Sections 2.6 and 2.12.4
Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected	Sections 2.9 and 2.12.3
Key factor(s) that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision)	Sections 2.10 and 2.12.1

1.7 - Authorizing Signatures

EPA, as the lead agency for the Milford Contaminated Aquifer Site (OHSFN0507973), formally authorizes this ROD.

X

Douglas Ballotti, Director
Superfund & Emergency Management Division
Signed by: DOUGLAS BALLOTTI

April 20, 2022
Date

EPA Region 5

PART II – DECISION SUMMARY

2.1 - Site Name, Location, and Brief Description

The Milford Site (OHSFN0507973) is located in Milford, Clermont County, Ohio, approximately 15 miles northeast of Cincinnati, Ohio. The groundwater contamination plume is primarily a tetrachloroethene (PCE) groundwater plume within a federally designated sole source aquifer (SSA) that is centered near the intersection of Lila Avenue and Baker Drive in Milford. The groundwater plume extends downgradient to the west to a municipal wellfield. The municipal wellfield is used as the public drinking water supply for the City of Milford. Figure 1 is a Site location map, Figure 2 a Site layout map, and Figure 3 depicts monitoring wells, municipal wells, and the shallow groundwater contaminant plume.

The contaminants of concern (COC) at the Site, which are CERCLA hazardous substances, consist of PCE and trichloroethene (TCE) in groundwater. Potential degradation products of PCE and TCE are also identified as COCs and include *cis*-1,2-dichloroethene (*cis*-1,2-DCE), *trans*-1,2-dichlorethene (*trans*-1,2-DCE), 1,1-dichloroethene (1,1-DCE), and vinyl chloride.

EPA is the lead agency for the Site, and the Ohio Environmental Protection Agency (Ohio EPA) serves as the support agency. The selected remedial action is expected to be funded through federal remedial action funding with associated state cost share.

2.2 - Site History and Enforcement Activities

2.2.1 Site History

Volatile organic compounds (VOCs) were first detected in Milford municipal water supply wells PW-1 and PW-3 in 1986. Chlorinated solvents detected in groundwater include PCE, TCE, *cis*-1,2-DCE, and 1,1,1-trichloroethane (1,1,1-TCA). Toluene was also detected. During various sampling events since 1986, including the most recent sampling in March 2019, PCE, 1,1,1-TCA, TCE, and DCE have been detected in well PW-3 at levels exceeding Maximum Contaminant Levels (MCLs) established by the Safe Drinking Water Act (SDWA). At times, TCE and PCE concentrations in well PW-1 have also exceeded MCLs. Other compounds, including 1,1,1-TCA, TCE, and toluene have been inconsistently detected in wells PW-2 and PW-4 since 1986 at concentrations less than MCLs. Aside from PCE in well PW-3 noted above, no VOCs were detected in Milford public water supply wells at concentrations above MCLs in the most recent sampling in March 2019.

Due to the presence of VOCs in the City's municipal water supply wells, drinking water treatment processes include air stripping for VOC removal followed by lime softening, filtration, fluoridation, and disinfection. The air stripper was installed in 1990. Initially, only water from wells PW-1 and PW-3, the most contaminated wells, was passed through the air stripper. Since September 2011, Milford has been running water from all wells through the air stripper. Although VOCs are present in the raw water, the finished drinking water after treatment currently meets both state and federal drinking water standards.

2.2.2 Previous Investigations

VOCs were first discovered in the municipal water supply wells by the City of Milford in 1986.

Initial investigations began in 1987 on behalf of the City of Milford. Groundwater Management, Inc. (GMI) installed three groundwater monitoring wells north of the municipal wellfield and two observation wells east of PW-3 as part of a hydrogeologic investigation. Results of the investigation indicated the need for caution regarding installing a new public well because of contamination in newly installed monitoring wells.

Ohio EPA Investigations

Between 1992 and 2009, Ohio EPA conducted multiple investigations at the Site that included the collection of soil gas samples, soil samples, and groundwater samples from the wellfield area and surrounding properties. The investigations confirmed that the aquifer and the wellfield area were contaminated with VOCs originating from sources east of the wellfield. The pattern of detections suggested that the source of 1,1,1-TCA was north of the source of PCE and TCE.

Sampling results from the area around the PIVOTEK facility (shown on Figures 1 through 3) indicated that a previous release of PCE and 1,1,1-TCA to soil and groundwater appeared to have been partially remediated. Although PCE and 1,1,1-TCA were detected in groundwater near PIVOTEK, the concentrations were lower than found in the area around Baker Feed. The detection of PCE and its degradation products TCE and *cis*-1,2-DCE in the commercial business area near Baker Drive suggested origination of the plume east of Baker Drive. One possible source was a dry cleaner formerly located in the shopping center on the west side of Service Road. No records for this dry cleaner were available in the Site background documents. However, historical research by Ohio EPA revealed that a dry cleaning facility operated at 527 Baker Drive between 1957 and 1967. This indicated a potential source of contamination near Baker Drive at the Baker Party Store.

PCE was detected in one sub-slab soil gas sample from the Baker Party Store at a concentration of 300 parts per billion by volume (ppbv). This concentration is equivalent to 2,034 micrograms per cubic meter ($\mu g/m^3$) and exceeded the EPA vapor intrusion screening level (VISL) sub-slab and near source soil gas screening level of 1,390 $\mu g/m^3$.

The highest concentrations of PCE were detected at locations immediately southwest of the Baker Feed area. Ohio EPA concluded that the source of the VOC contamination that affects the Milford wellfield appears to be at or near Baker Feed.

2.2.3 Remedial Investigation/Feasibility Study

After the Site was listed on the National Priorities List (NPL) in 2011, EPA initiated an investigation to identify potentially responsible parties (PRPs) capable of performing the remedial investigation (RI). EPA was unable to identify any liable and viable PRPs to conduct the RI and initiated a federally funded RI in 2013. The RI included three sampling phases conducted from December 2013 through March 2019. The RI activities, data collection methodologies, resulting data, physical characteristics of the Site, nature and extent of contamination, contaminant fate and transport, and conceptual site model (CSM) are documented in detail in the RI report and summarized in Section 2.5. The RI was finalized in October 2020.

A feasibility study (FS) was prepared by EPA to develop and evaluate remedial alternatives to address unacceptable risks and hazards to human health and the environment, as identified in the Final RI report, and meet all ARARs. The evaluation of remedial alternatives conducted in the

FS are summarized in later sections of this ROD. EPA finalized the FS report in April 2021.

Additional details are contained in the Final RI and FS Reports and other documents in the Site's Administrative Record.

A human health risk assessment (HHRA) and a screening-level ecological risk assessment (SLERA) were also completed as part of the RI. The HHRA and SLERA are presented as Appendix E in the RI report and summarized in Section 2.7.

2.3 - Community Participation Activities

The RI Report, FS Report, Proposed Plan, and other related documents for the Site are in the Administrative Record file, which is and was available to the public at the following locations: the information repository maintained at the EPA Region 5 Records Center, 77 West Jackson Boulevard (7th Floor), Chicago, Illinois; the Site information repository located at the Clermont County Public Library – Milford Miami Township Branch, 5920 Buckwheat Road, Milford, Ohio; and online at www.epa.gov/superfund/milford-aquifer. The notice of the availability of these documents was published in *The Cincinnati Enquirer* on December 4, 2021, and *The Milford-Miami Adviser* on December 8, 2021. A public comment period was held from December 8, 2021, to January 7, 2022. Due to COVID-19 restrictions, EPA held a virtual-format public meeting on December 15, 2021, instead of an in-person public meeting to avoid in-person contact. EPA made this decision in accordance with the Centers for Disease Control guidance urging the postponement of mass gatherings. In addition, EPA posted an online, pre-recorded presentation describing the Proposed Plan. The presentation was available to the public throughout the comment period and contained the same information that would have been presented during an in-person meeting.

Members of the public were advised that they could submit comments on the Proposed Plan in a number of ways: (1) using the comment form on EPA's webpage at www.epa.gov/superfund/milford-aquifer ; (2) submitting a written comment via email to palomeque.adrian@epa.gov; (3) submitting a written comment by mail to U.S. EPA Region 5, Attention: Adrian Palomeque, 77 West Jackson Boulevard (Mail Code: RE-19J), Chicago, Illinois 60604-3590; or (4) leaving a verbal comment by voicemail at 312-353-6646.

EPA's responses to the comments received during the public comment period are included in the *Responsiveness Summary,* which is provided in Part III of this ROD.

2.4 - Scope and Role of Operable Unit or Response Action

EPA's overall strategy for cleaning up the Site, as reflected in this ROD, is to address contaminated groundwater at the Site so that future unacceptable risks to human health and the environment posed by contaminants are significantly reduced to protective levels. Ingestion of untreated water from this aquifer poses a potential future risk to human health because EPA's acceptable risk range is exceeded, and concentrations of contaminants are greater than the MCLs for drinking water (as specified in the SDWA). The Selected Remedy presents the final response action for the Site and includes treatment of low-level threat groundwater contamination.

2.5 - Site Characteristics

2.5.1 <u>Conceptual Site Model for Milford Contaminated Aquifer Site</u>

The conceptual site model (CSM) provides an understanding of the Site based on the sources of the COCs, potential transport pathways, and environmental receptors. Based on the nature and extent of contamination and the fate and transport mechanisms described in the RI and FS reports, the refined CSM for the Site identified the following COCs for human health receptors:

- Tetrachloroethene and trichloroethene were identified as COCs for human health exposures in groundwater used as a potable source.
- Based on the SLERA methodology, aquatic receptors exposed to Little Miami River (LMR) surface water and sediment are not at risk for adverse effects from groundwater discharges, and no other ecological receptors have been identified for the Site.

A graphical depiction of the CSM for the Site is shown in Figure 4. The CSM for the HHRA is shown in Figure 5 and the CSM for the SLERA is shown in Figure 6.

2.5.2 <u>Site Overview</u>

The MCA Site is located within the City of Milford, Clermont County, Ohio. The MCA is situated within the Till Plains section of the Central Lowland physiographic province. The local topography is flat to gently rolling and ranges from about 680 feet above mean sea level (amsl) to 1,100 feet amsl. The principal waterway in the area is the Little Miami River, which flows from north to south.

The City of Milford is in western Clermont County, Ohio, approximately fifteen miles northeast of Cincinnati, Ohio on the east bank of the LMR, just north of the confluence of the east and main forks of the river (Figure 1, Site Location Map). The Milford municipal wellfield is located along Water Street, adjacent to the main fork of the LMR. The wellfield consists of four production wells drawing water from a shallow sand and gravel aquifer. The land use directly south of the wellfield is primarily commercial, while land use to the east is primarily mixed residential and commercial, with some industrial activity interspersed throughout the area.

The MCA is a plume of VOCs in groundwater detected above screening levels. The Site contamination plume originates near the intersection of Baker Drive and Lila Avenue. The contaminated groundwater plume flows west-northwest along Lila Avenue and is approximately 250-450 feet wide, depending on the contaminants' concentrations respective to their screening levels. The plume then flows west-southwest along Main Street and terminates at the Milford wellfield, a length of approximately 0.6 miles. However, it is possible that after periods of high rainfall, some contaminated groundwater may discharge to the LMR.

2.5.3 <u>Geologic/Hydrogeologic Setting</u>

Regional Geology
Clermont County is located within the Illinoian Till Plain section of the Central Lowland physiographic province. This is characterized as usually lacking glacial features, containing many buried valleys and modern valleys alternating between broad floodplains and bedrock gorges.

Partially filled valleys result in buried valley aquifer systems.

The Illinoian Till Plain consists of Illinoian-age (Pleistocene) till with loess cap that is underlain by Ordovician and Silurian-age shale and limestone. Uppermost subsurface materials in the area typically consist of Pleistocene glacial deposits that are predominantly clay-rich glacial till, with sand or gravel in places. These deposits partially fill buried valleys containing glacial outwash material.

The Pleistocene deposits in the region overlie undifferentiated shale and limestone bedrock, consisting of the Fairview Formation, overlying the Kope Formation. Both formations consist of interbedded shale and limestone consisting of 30-40 and 20-30 percent limestone, respectively. The Kope Formation is fossiliferous throughout and is reported to reach a maximum thickness of 208 feet.

The Site lies in the LMR valley and just east of the river. The river valley was formed following the retreat of the Wisconsinan glacier and cuts through the Fairview formation. Bedrock immediately bordering the valley is Kope Formation bedrock; therefore, the bedrock at the Site is likely a part of the Kope Formation.

Clermont County is located within the Cincinnati Arch, which extends from the northernmost part of Alabama through western Ohio and is bounded to the north by the Michigan Basin, to the east by the Appalachian Basin, to the south by the Black Warrior Basin, and to the west by the Illinois Basin. It is believed that the arch resulted from the subsidence of the surrounding basins and not from regional uplift. The Cincinnati Arch, which slopes gently to the north with flanks that dip gently to the east and west, influenced late Ordovician sedimentation in the region. The arch provided a favorable environment for deposition of limestone in shallow waters located along the gently sloped regions of the arch and fine sediment, originating from the uplift and erosion of the ancestral Appalachians, in the shallow sea to the east.

Site-Specific Geology
Site-specific geology was evaluated during the RI activities through visual classification and logging of subsurface soils collected during the drilling of soil borings for vertical aquifer sampling (VAS) and monitoring well installation.

The area just south of the Site between the wellfield and the Baker Feed property contains an area of elevated bedrock, with remnant bedrock at elevations greater than or equal to 580 feet amsl. The United States Geological Survey (USGS) topographic map for the area shows that the ground surface elevation is about 560 feet amsl in the broad, relatively level area near the intersection of Lila Avenue and Main Street. An area of elevated bedrock also exists directly between Baker Feed and PIVOTEK, where bedrock elevation did not exceed 580 feet amsl or the ground surface, but weathered bedrock was encountered at 3.5 to 4 feet below ground surface (bgs). The elevated bedrock surface slopes steeply to the north, as evidenced by soil borings that were drilled along Lila Avenue to depths of 75 feet bgs (VAS 207) or 80 feet bgs (VAS 204) before encountering bedrock. As noted above, the bedrock at the Site is believed to be Kope Formation, which consists of interbedded fossiliferous shale and limestone. The study of available well log data indicates that the buried valley bedrock floor forms an uneven surface beneath the Site. Bedrock elevations range from 462.5 to 480 feet amsl at and immediately east of the municipal wellfield. Depths to bedrock near Baker Feed and PIVOTEK are not precisely known, because monitoring wells or previous VAS studies did not penetrate the entire thickness of unconsolidated materials. At Baker Feed, depth to bedrock is more than 60 feet bgs (~511 feet amsl), or below the bottom of the deepest monitoring well (MW) boring in the area, MW-14. Similarly, MW- 16 places the depth to bedrock at PIVOTEK more than 40 feet bgs (~526 feet amsl).

The bedrock is overlain primarily by unconsolidated sand and gravel with intermittent silty and clayey layers. Near the wellfield, the thickness of unconsolidated sand and gravel that directly overlays bedrock ranges from about 50 to 100 feet.

Based on boring and well logs, an approximately 30-foot stiff clay layer is present directly above bedrock in the area of Baker Feed and PIVOTEK that becomes thinner west of Baker Feed and north of the area of elevated bedrock. About five to ten feet of soft clay or silty clay are present near the surface in the Baker Feedarea.

Regional Hydrogeology

The LMR Aquifer is unconfined, and thus receives direct recharge from precipitation and is susceptible to contamination by the release of chemicals at the land surface. The mean annual precipitation is approximately 44.8 inches, of which approximately one-third infiltrates and recharges the groundwater. Additional recharge to the aquifer occurs through the fractures in the bedrock and valley walls. However, this amount of recharge is negligible compared to the areal recharge component, yielding supplies adequate for small farms and households. The valley consists of permeable sand and gravel deposits that can yield well pumping rates as much as 800 gallons per minute where recharge is available from the river. Wells installed in bedrock in areas where saturated valley fill aquifer is thin or absent typically yield less than three gallons per minute.

The sand and gravel aquifer within the LMR Valley is a federally designated SSA System, a designation to protect drinking water supplies in areas with no reasonably available alternative sources of drinking water. The entirety of the site is located within a SSA which EPA identifies as the Greater Miami Buried Aquifer & Ohio-Kentucky-Indiana (OKI) Extension SSA.

Site-Specific Hydrogeology

Numerous monitoring wells have been installed at the Site during previous investigations. The most recent depth to water measurements were taken by SulTRAC in March of 2018. Depth to water as measured in the monitoring wells at that time ranged from about 18 to 65 feet bgs. Groundwater is encountered about 45 feet bgs in the Baker Feed area. Groundwater elevations were highest near the Baker Feed area, ranging from about 525 to 527 feet amsl. Groundwater elevations from previous sampling events show that groundwater elevations are higher near PIVOTEK at approximately 534 feet amsl. At PIVOTEK, groundwater is encountered about 32 feet bgs.

Groundwater potentiometric surfaces were created for each of the well gaging events conducted on August 30, 2013, April 10, 2014, April 21, 2017, and March 27, 2018 (Figures 7 through 10). Each of these maps shows a very similar flow pattern. In the immediate vicinity of Baker Feed, groundwater flow is directed north-northwest, then to the west towards the LMR and the municipal wellfield. In the immediate vicinity of the pumping wells, groundwater flow is expected to flow radially towards the wells. Pumping from the municipal wells is expected to induce recharge of the aquifer from the LMR along the riverbank adjacent to the pumping wells; however, this expected recharge cannot be observed from the available monitoring wells because there are no monitoring wells between the municipal pumping wells and the LMR.

A bedrock high is present to the south of Baker Feed, and this feature may create a northward component to groundwater flow in the immediate area. The area of elevated bedrock between the wellfield and PIVOTEK and between Baker Feed and PIVOTEK is expected to act as an impermeable boundary. Thus, groundwater flow in the aquifer is restricted to outside this area, as portrayed in Figures 7 through 10.

Three temporary wells were installed near PIVOTEK during SulTRAC's Phase I investigation. Groundwater elevation data from these temporary wells in the PIVOTEK area was measured on April 10, 2014, before the wells were removed. The northernmost well, TW-15, had a groundwater elevation (536.34 feet amsl) approximately 3.4 feet higher than the southernmost well, TW-12 (532.92 feet amsl), which is similar to the groundwater elevation in permanent well MW-16 near PIVOTEK (533.34 feet amsl). The potentiometric surface for this gaging event (Figure 8) shows that groundwater flow from the PIVOTEK area was directed southwest, away from Baker Feed. A 2013 Ohio EPA map (Figure 11) shows that groundwater from the PIVOTEK area flows along a southern-trending arc towards the east fork of the LMR, away from Baker Feed. Analytical data collected during SulTRAC's Phase II investigation confirms that groundwater from the Baker Feed area does not flow south towards PIVOTEK, and instead flows to the north-northwest. Contaminants detected at Baker Feed were either not detected or were detected at significantly lower levels at PIVOTEK.

Aquifer Properties

The portion of the MCA that exceeds MCLs is approximately 50-450 feet wide, depending on the contaminant. The plume appears to originate at Baker Feed and terminate near the wellfield and LMR, however, it is possible that after periods of high rainfall, some contaminated groundwater may discharge to the LMR. The contaminated portion of the aquifer is about 35 to 45 ft bgs, and the ground surface elevation drops by about 50 from Baker Feed to the municipal wellfield. Based on hydraulic conductivity and gradient of the MCA, the estimated time for flow of contaminants from Baker Feed to the wellfield is approximately 5 months. Characterization and testing of the MCA is described below.

A 1987 GMI aquifer pumping test conducted at MW-3 used semi-logarithmic and logarithmic analysis of field data to acquire a transmissivity value of approximately 300,000 gallons per day per foot (gpd/ft) and a saturated aquifer thickness of 38 feet. From this, hydraulic conductivity was calculated by dividing transmissivity by the saturated aquifer thickness to get a hydraulic conductivity of 7,900 gallons per day per square foot (gpd/ft^2) (0.37 centimeters per second [cm/s]), which is comparable to an estimated typical hydraulic conductivity 0.32 cm/s for sand and gravel.

Laboratory analysis from samples collected from the borehole of MW-1 during this study indicated that the hydraulic conductivity of the aquifer in the vicinity of MW-1 ranges from 450 to 3,300 gpd/ft^2 (0.02 to 0.16 cm/s).

As shown in Figures 9 and 10, groundwater elevation data indicate a steeper hydraulic gradient at the eastern part of the site and a flatter gradient at the western half near the wellfield. The eastern hydraulic gradient of 0.012 (dimensionless) was calculated by dividing the difference in groundwater elevation between well MW-20 (527.13 ft amsl) and the 512 feet groundwater elevation contour (Figure 8) by the distance between the two wells along the groundwater flow path (approximately 1,250 feet). The western hydraulic gradient of 0.005 was calculated by dividing the difference in groundwater elevations between the 512 feet and 505 feet groundwater elevation contours (7 feet) by the distance between the contours along the groundwater flow path (approximately 1,460 feet).

Effective porosity for this sand and gravel was estimated to be 0.35, which is within the range of typical porosities for a sand and gravel aquifer.

Using estimated and site-specific aquifer parameters, the estimated advective groundwater flow velocity is approximately 0.013 cm/s (36 feet per day [ft/day]) on the east side of the site and 0.005 cm/s (14 ft/day) on the west. Using these calculated values and the distances above, groundwater travel time from Baker Feed to the wellfield is estimated to be approximately five months.

Water Usage
Drinking water is supplied to the City of Milford from the contaminated aquifer. The groundwater is treated with an air stripper prior to distribution to remove VOCs. Groundwater ordinances are in place that prohibit the installation of groundwater wells for potable use. There are no known privately-owned wells being utilized for potable use.

2.5.4 Extent of Contamination

The RI determined that the primary source of the contaminants found above screening levels is located at the Baker Feed property. EPA conducted the RI between December 2013 and March 2019 using a phased approach. The significant findings and conclusions from the Site characterization activities completed during the RI are summarized below. The October 2020 Final RI report provides additional detail about Site investigations and can be found at: www.epa.gov/milford. The primary contaminants found above screening levels were PCE and TCE.

Groundwater
The only groundwater contaminants that EPA identified above MCLs are PCE and TCE. The MCLs for PCE and TCE are the SDWA MCLs of 5 micrograms per liter (µg/l). The highest PCE (760 µg/L) and TCE (35 µg/L) detections that EPA found during the RI were from monitoring wells located near Baker Feed. EPA identified PCE degradation products, including *cis*-1,2-DCE, in groundwater but not above its MCL (70 µg/L). The groundwater plume is narrow, well-defined horizontally and vertically, and is limited to the upper surficial aquifer. The maximum contaminant concentrations in groundwater are summarized in Table 1.

Soil
EPA performed soil sampling at 66 locations at various depths. The highest concentrations of PCE and TCE in soil were found in the eastern and southern portions of the Baker Feed property. Soil samples with the highest concentrations of PCE and TCE generally correlated with the highest concentrations of PCE and TCE detected in groundwater monitoring wells. A variety of other VOCs such as common laboratory contaminants and benzene, toluene, ethylbenzene, and xylene (BTEX) compounds were detected in soil samples at widely dispersed locations at low concentrations relative to soil screening levels (SSLs). None of the soil samples exceeded SSLs for direct contact, but several deeper soil samples exceeded protection of groundwater regional screening levels

(RSLs) for PCE and TCE. The maximum contaminant concentrations in soil are summarized in Table 2. A pre-design investigation will be performed to confirm the extent and volume of soil contamination contributing to groundwater contamination.

Soil Vapor
Nine valid soil vapor samples were collected at varying depths above the plume of impacted groundwater and compared to the default VISLs for sub-slab soil vapor. PCE was detected above its VISL in one sample at a depth of more than 40 feet bgs, however the PCE concentration in a shallower sample at the same location was below one percent of the VISL. Benzene was frequently detected in soil gas above the VISLs but is likely not Site-related due to its low concentrations in the impacted groundwater. In addition, the soil vapor samples with benzene concentrations above its VISL were collected near a gasoline station and do not exceed Ohio EPA risk levels. The maximum contaminant concentrations in soil vapor are summarized in Table 3.

Ohio EPA has requested that additional soil vapor sampling be done to ensure that seasonality is not an issue with the Baker Feed property. This additional sampling will be performed during the remedial design phase. At this time, the vapor intrusion exposure pathway is not believed to be of concern at the Site.

2.6 - Current and Potential Future Land and Resource Uses

Current Land Use
The land use directly south of the wellfield is primarily commercial, while land use to the east is primarily mixed residential and commercial, with some industrial activity interspersed throughout the area. The Baker Feed property is approximately 1.25 acres and is currently owned by a refillable vegan bath and body works company.

Future Land Use
Future land use at the Site is not expected to differ significantly from current land use. The Baker Feed property will remain non-residential, but portions of the property may be redeveloped in the future. Future land use within residential areas is expected to remain the same.

Groundwater
The groundwater under the Site is currently designated as a federal sole source aquifer and used as a potable water supply by the City of Milford. Due to the presence of VOCs in the City's municipal water supply wells, drinking water treatment processes include air stripping for VOC removal followed by lime softening, filtration, fluoridation, and disinfection. The air stripper was installed in 1990. Initially, only water from wells PW-1 and PW-3, the most contaminated wells, was passed through the air stripper. Since September 2011, Milford has been running water from all wells through the air stripper. Although VOCs are present in the raw water, the finished drinking water after treatment currently meets both state and federal drinking water standards. It is anticipated that the groundwater will continue to be used as a drinking water source in the future.

2.7 - Summary of Site Risks

As part of the RI/FS, a HHRA and a SLERA were conducted to determine the current and future risks to human health and the environment from Site contaminants. To conduct these risk assessments, EPA assumed that the current land use at the Site will remain the same in the future, which consists of mostly residential and small commercial operations. EPA also assumed that properties at the Site will continue to have access to municipal water. EPA issued both risk assessments in October 2020 as appendices to the RI report.

The HHRA evaluated the potential for adverse risks associated with exposure to groundwater at the Site. The SLERA evaluated potential ecological risks to receptors from surface water and sediment of the LMR.

2.7.1 <u>Human Health Risks</u>

The HHRA estimates the risks at a site if no remedial action is taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the HHRA that was conducted for the Site.

For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

where:

Risk = a unitless probability (e.g., $2x10^{-5}$) of an individual's developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., $1x10^{-6}$). An excess lifetime cancer risk (ELCR) of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ < 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that contaminant are unlikely. The hazard index (HI) is generated by adding the HQs for all COCs that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. An HI < 1 indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic noncarcinogenic effects from all contaminants are unlikely. An HI > 1 indicates that site-related exposures may present a risk to human health.

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

where:

CDI = chronic daily intake
RfD = reference dose.

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

The RI sample results were evaluated in the HHRA to identify the COCs in various media that pose a current and/or future potential risk to human receptors. A contaminant was carried through the risk assessment as a COC if it posed an ELCR greater than EPA's acceptable risk range of $1x10^{-4}$ (1 in 10,000 chance) to $1x10^{-6}$ (1 in 1,000,000 chance) for cancer risks or exceeded an HI of 1 for non-cancer risks and was above background.

Groundwater and soil vapor were identified as media where a contaminant presents an unacceptable risk. However, soil vapor risks were determined using modeled concentrations from groundwater. Actual soil vapor concentrations obtained during the RI indicate that vapor intrusion is not a risk at the Site. The contaminants identified as COCs in groundwater are PCE and TCE. Potential degradation products cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE and vinyl chloride were also identified as COCs. Other media investigated (soil) did not have individual contaminant ELCRs or non-cancer hazards greater than EPA's acceptable risk range for appropriate receptors.

Final COCs and HHRA Results
Table 4 lists the final COCs for the Site. PCE and TCE were identified as the risk driver for groundwater contamination. Potential degradation products cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and vinyl chloride are also included.

A summary of the COCs at the Site that pose unacceptable risks to human health is provided in Table 5. This table provides information about the exposure areas, exposure points (i.e., media), receptors, and exposure routes of concern, along with the corresponding cancer risk and/or non-cancer hazard index for COCs in groundwater. Table 6 shows that the Site poses unacceptable risks because non-cancer HIs exceed 1 for COCs in groundwater, therefore providing a basis for taking action.

Table 7 presents the COCs and specific exposure point concentrations (EPCs) for the potable groundwater exposure pathway (i.e., the concentration that was used to estimate the exposure and risk from each COC). The table includes the minimum and maximum concentrations detected for each COC, as well as the frequency of detection (i.e., the number of times the contaminant was detected in the samples collected at the Site), the EPC, and how the EPC was derived. Table 8 provides cancer toxicity information that is relevant to the COCs in groundwater.

2.7.2 Ecological Risks

The ecological risk assessment and related habitat assessment concluded that the LMR is the most ecologically valuable habitat associated with the Site. Concentrations of VOCs in direct samples of groundwater nearest the LMR did not exceed their SLERA ecological screening values for benthic and aquatic receptors. Therefore, further evaluation in a baseline ecological risk assessment was not recommended for this riverine habitat. Based on the SLERA methodology, aquatic receptors exposed to LMR surface water and sediment are not at risk for adverse effects from groundwater discharges, and no other ecological receptors have been identified for the Site.

2.7.3 Basis for Action

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

2.8 - Remedial Action Objectives

Remedial action objectives (RAOs) are goals for protecting human health and the environment. RAOs are developed to address the contaminant levels and exposure pathways that present unacceptable current or potential future risk to human health and the environment. RAOs were developed for the Site based on the contaminant levels and exposure pathways estimated to pose anunacceptable risk to human health and the environment, as determined during the RI.

The RAOs for the Site are described below:

- Prevent unacceptable human health risk and hazard due to contact with, or ingestion of, groundwater contaminated by constituents of concern (tetrachloroethene, trichloroethene, and potential degradation byproducts [including *cis*-1,2 dichloroethene, *trans*-1,2-dichlorethene, 1,1-dichloroethene, and vinyl chloride]) with concentrations above federal and state drinking water standards.

- Restore the Milford Contaminated Aquifer to its beneficial use by achieving the federal and state drinking water standards for tetrachloroethene, trichloroethene, and potential degradation byproducts (including *cis*-1,2 dichloroethene, *trans*-1,2-dichlorethene, 1,1-dichloroethene, and vinyl chloride).

- Prevent migration of constituents of concern (tetrachloroethene, trichloroethene, and potential degradation byproducts [including *cis*-1,2 dichloroethene, *trans*-1,2-dichlorethene, 1,1-dichloroethene, and vinyl chloride]) with concentrations above federal and state drinking water standards from the Baker Feed Property to the municipal wellfield.

2.9 - Description of Alternatives

Remedial alternatives for the Milford Site are presented below. The alternatives are numbered to correspond with the numbers in the FS Report and are further explained in the FS Report.

Capital costs are those expenditures that are required to construct a remedial alternative. O&M costs are those post-construction costs necessary to ensure or verify the continued effectiveness of a remedial alternative and are estimated on an annual basis. The "present worth" cost is the amount of money which, if invested in the current year, would be sufficient to cover all the costs over time associated with a project. The present worth costs for the remedial alternatives below were calculated using a discount rate of seven percent and a 30-year time interval. Construction time is the time required to construct and implement the alternative and does not include the time required to design the remedy, negotiate performance of the remedy with responsible parties, or procure contracts for design, construction, and/or oversight.

2.9.1 Description of Common Elements Among Remedial Alternatives

All of the remedial alternatives evaluated in the FS, except the no action alternative, include the following common elements:

- ICs to prohibit the private potable use of groundwater until RAOs are achieved within the MCA plume.
- Verification that properties within and near the plume are presently connected to the municipal water supply, which will continue to be treated by the City to achieve MCLs.
- Institutional and engineering controls (such as signs, fencing, etc.) necessary to protect public safety during construction and, if applicable, operation of the remedy. Additional ICs and engineering controls will be included, as applicable, to protect components of the remedy (such as force mains moving contaminated groundwater). The specific controls will be decided during the design phase.
- A pre-design investigation with the objective of better characterizing the source area(s) and providing information necessary for design. This investigation is anticipated to include soil and groundwater sampling, MW installation and sampling, and analyses (for VOCs and other parameters such as grain size, alternative-specific analyses (such as but not limited to measuring oxidant or reductant demand, measuring specific bacteria, and or nutrient needs).
- Installation of a monitoring network for the long-term monitoring of the plume. It is anticipated that both existing and new MWs (and municipal wells) may be part of the network. The network is likely to be similar for Alternatives 2a, 2b, 2c, 3, and 4, as the primary purpose is monitoring the untreated portion of the plume downgradient of the Baker Feed property to assure that preliminary remediation goals (PRGs) will be met. PCE concentrations greater than the PRG (up to 15 µg/L) are present between the Baker Feed property and the municipal wellfield, and no known additional source has been identified. TCE concentrations above the PRG have not been identified in this area. The RI indicates that groundwater travels from the Baker Feed property to the municipal wellfield in approximately five months. Therefore, it is anticipated that groundwater located in the area between the Baker Feed property and the municipal wellfield will meet PRGs within

approximately six months after source area treatment. In the meantime, groundwater above the PCE PRG that travels to the municipal wellfield will be captured and treated by the existing air stripper.

2.9.2 Description of Remedial Alternatives

Alternative 1 - No Action

EPA is required to evaluate a "no-action" alternative when considering potential remedial actions for a site to provide a baseline for comparison to the other potential response actions. The no-action alternative means that no remedial action would be undertaken and that no ICs, containment, removal, treatment, or other mitigating actions would be implemented to control exposure to COCs. The no-action alternative assumes that the City would continue to pump and operate its current municipal wellfield. Therefore, the potential long-term human health and environmental risks associated with ingestion of the COCs which EPA identified in its risk assessments would not be mitigated. In addition, contamination from the Site would not be contained and could spread and expand the Site boundaries.

Estimated Costs for Alternative 1

Direct Capital Costs:	$0
O&M Costs:	$0
Total Periodic Costs:	$0
Total Present Value:	$0
Estimated Construction Time:	0 years

Alternative 2 – In Situ Treatment with reagents

Alternative 2 has been divided into three sub-alternatives, based on the reagents used as the primary treatment mechanism (other reagents may be used in the final design as part of pre- or post-treatment areas, or to augment the primary treatment mechanism). Because in situ treatment with reagents can be targeted to specific areas of contaminants, measures can be more focused than other alternatives. Alternatives 2a, 2b, and 2c all include (for cost estimation purposes) source area injections over approximately 6,500 square feet (SF) on the Baker Feed property, targeting a 10-foot-thick treatment interval. Additionally, they include an approximately 5,400-square-foot PRB located downgradient of the Baker feed property, targeting a 15-foot-thick zone, as an additional measure to further treat contamination downgradient from the source area.

Alternative 2a – In Situ Treatment – In Situ Chemical Reduction (ISCR) (Exposure pathway elimination, ICs, in situ treatment via ISCR near source area, monitoring)

This alternative includes active in situ measures to treat groundwater using reducing agents near the source area near Baker Feed. A review of Site data indicates that anaerobic biodegradation is likely not occurring to a significant extent, in part due to aerobic conditions in the aquifer. Therefore, an abiotic approach, conceptually using zero-valent iron (ZVI) as the primary mechanism, but potentially using other products/amendments as well (such as activated carbon or electron donors) as part of the treatment process may be used. ZVI has capabilities which make it useful in this type of approach; it can be persistent in the subsurface (up to several years or more) and can provide ongoing treatment even if the source area(s) are not fully treated, if installed as a barrier-type application. The dosing of and selection of particular ISCR reagent(s), such as ZVI, can be adjusted to compensate for the oxic nature of an aquifer. The design could also include geochemical conditioning prior to the main treatment area. Several vendors of ZVI products indicate in their literature that their products can work in the presence of dissolved oxygen.

The main treatment for this alternative is anticipated to use ZVI to promote contaminant degradation; however, final selection of the reagent(s) will be made in the remedial design. The main treatment areas would be located in the vicinity of the source area at the former Baker Feed property, and a PRB would be located a short distance downgradient of the Baker Feed property.

Groundwater monitoring is also a component of this remedy, primarily to address contaminated water that has already gone past the treatment area(s), to evaluate the effectiveness of the remedial action, and assure this groundwater achieves the PRGs.

For the purposes of the cost estimate, source area treatment areas totaling approximately 6,500 SF and 10 feet thick are assumed on the Baker Feed property. A PRB, totaling 5,400 SF located west of the Baker Feed property is also utilized. The cost estimated is based on a vendor quote, where an emulsified nano-and micro-scale ZVI product is used on the Baker Feed product and a non-emulsified ZVI product is used as a PRB. The same treatment areas are assumed for Alternatives 2b and 2c.

<u>Alternative 2b – In Situ Treatment – In Situ Chemical Oxidation (ISCO) (Exposure pathway elimination, ICs, in situ treatment via ISCO near source area, monitoring)</u>

This alternative includes active measures to treat groundwater using oxidizing reagents near the source area near Baker Feed. A review of Site data indicates that anaerobic biodegradation is likely not occurring to a significant extent, in part due to aerobic conditions in the aquifer. Because of the oxic conditions, conditions for treatment via in situ oxidation are favorable. Therefore, an approach using an oxidizing agent (a proprietary persulfate-based reagent is used in the cost estimate) is used as the primary mechanism, but other products/amendments may potentially be used to augment the remedy. The oxic conditions of the aquifer are favorable for ISCO, however, ISCO reagents generally have a short period of effectiveness (typically hours to a few weeks). The dosing and selection of particular ISCO reagent(s), would be part of the design process (other reagents are available, including various formulations of hydrogen peroxide/Fenton's reagent, and permanganates). Previous sampling included no analysis which could be used to evaluate oxygen demand; therefore, part of the pre-design investigation would include sampling and analysis to account for oxidant demand of the soils and aquifer media. The design could also include geochemical conditioning prior to the main treatment area to enhance the implementation of the remedy.

The main treatment for this alternative uses an ISCO agent (the cost estimate is based on a proprietary sodium persulfate-based reagent). It is anticipated that the main treatment area would be located in the vicinity of the source area at the former Baker Feed property, and a PRB would be located a short distance downgradient of the Baker Feed property.

Groundwater monitoring is also a component of this remedy, primarily to address contaminated water that has already gone past the treatment area(s), to evaluate effectiveness of the remedial action, and assure this groundwater achieves PRGs. Frequency of monitoring would be quarterly in the initial quarters following the injections, with frequency reductions to follow.

For the purposes of the cost estimate, source area treatment areas totaling approximately 6,500 SF and 10 feet thick are assumed on the Baker Feed property. A PRB, totaling approximately 5,400 SF located west of the Baker Feed property is also utilized. The same treatment areas are assumed for Alternatives 2a and 2c.

Alternative 2c – In Situ Treatment – Combined Remedy (Exposure pathway elimination, ICs, in situ treatment via combined approaches near source area, monitoring)

This alternative includes various elements of in situ treatment to treat contaminated groundwater. A pre-design investigation would be conducted to obtain current information to aid in completion of the remedial design. Alternative 2c is different from Alternatives 2a and 2b, which each use a single approach (ISCR and ISCO, respectively) as the primary treatment mechanism by expressly using a combined approach involving multiple groundwater treatment mechanisms.

This alternative includes active measures to treat groundwater using a combination of several approaches near the source area near Baker Feed. A combination of approaches, including activated carbon to capture the contaminants, ZVI to create reducing conditions and treat contaminants, and introduction of electron donor material and biological augmentation for enhanced reductive dechlorination (ERD) is used in the cost estimate; however, the final design may use a different combination of approaches, based on the results of the pre-design investigation. Although there is limited evidence at present that anaerobic biodegradation is occurring, the presence of *cis*-1,2-DCE in the plume suggests that some degradation may be occurring. The combination of reagents is expected to create reducing conditions within the treatment areas. Also, the activated carbon can sorb contaminants (minimizing or stopping their migration) in a wide variety of aquifer conditions. Additional data, to be collected during the pre-design investigation, would be necessary to refine this approach. The combined remedy would use the activated carbon to capture contaminants (which is functional over a wide range of geochemistry) and ZVI and ERD to treat and degrade the contaminants to harmless compounds. The design could include geochemical conditioning prior to the main treatment area.

Groundwater monitoring is also a component of this remedy, primarily to address contaminated water that has already gone past the treatment area(s), to evaluate effectiveness of the remedial action, and assure this groundwater achieves PRGs. Frequency of monitoring would be quarterly in the initial quarters following the injections, with frequency reductions to follow.

For the purposes of the cost estimate, source area treatment areas totaling approximately 6,500 SF and 10 feet thick are assumed on the Baker Feed property. A PRB, totaling approximately 5,400 SF and 15 feet thick, located west of the Baker Feed property is also utilized. The estimated operation and maintenance (O&M) and total periodic[1] costs presented below for each of the three in situ treatment with reagents alternatives are annual costs. Though the number of years that these alternatives would need to be operated varies depending on the overall groundwater remedy

[1] Periodic costs are costs that are expected to be encountered while the treatment alternative is being implemented that do not fit in the O&M or direct capital costs categories.

selected, the total present value presented below for each of the three alternatives is based on 30 years of operation, so they are directly comparable.

Estimated Costs for In Situ Treatment with Reagents Alternatives

	Estimated Costs for Alternative 2a	*Estimated Costs for Alternative 2b*	*Estimated Costs for Alternative 2c*
Direct Capital Cost	$3,046,000	$1,546,000	$2,746,000
O&M Costs (Annual)	$36,000	$36,000	$36,000
Total Periodic Costs	$300,000	$300,000	$300,000
Total Present Value	$3,601,000	$2,101,000	$3,301,000
Estimated Construction Time	6 months	9 months	9 months

<u>Alternative 3 – In Situ Thermal Treatment (Exposure pathway elimination, ICs, in situ thermal treatment of source area)</u>

This alternative includes active measures to treat contamination near the source area at the former Baker Feed property. The treatment technology uses a series of electrodes to heat the contaminated soil and groundwater. The heating results in several mechanisms to mobilize the contaminants for capture, including boiling and steam stripping. A contaminant capture system similar to a soil vapor extraction (SVE) system is used to capture the contaminants. Specific thermal treatment processes will be selected during the design phase. For cost estimation purposes, the thermal treatment system is assumed to cover 40,000 SF with a 20-foot thickness (from approximately 40 feet bgs to 60 feet bgs). The area of the thermal treatment is larger because thermal treatment cannot be targeted to isolated areas as well as injection-based alternatives.

Estimated Costs for Alternative 3:

Direct Capital Costs:	$13,042,000
Annual O&M Costs:	$36,000
Total Periodic Costs:	$300,000
Total Present Value:	$13,597,000
Estimated Construction Time:	6 months

<u>Alternative 4 – Ex Situ Treatment - Pump and Treat (Exposure pathway elimination, ICs, groundwater pump and treat near source area, monitoring)</u>

This alternative includes active measures to treat groundwater near the source area at the Baker Feed property. Several extraction wells would be installed to remove groundwater, which would be sent to a new on-site groundwater treatment plant. Extraction wells would be located at Baker Feed and additional wells beyond the Baker Feed property may be needed, as determined in the final remedial design. At the new groundwater treatment plant, the extracted groundwater would be treated to remove VOCs. The specific treatment process would be determined during the design phase but may include some combination of the following: filtration, pH adjustment, air stripping with off-gas treatment, and carbon adsorption. As part of the design process, several potential discharge locations would be evaluated. Once treated, water would be discharged to the LMR or the

East Fork of the LMR, through a newly-constructed discharge pipe, or, if sufficient capacity is available, through the existing sanitary sewer system to the Milford wastewater treatment plant.

Although permits are not required for CERCLA remedial activities which occur entirely on Site, the activities would have to comply with the same technical guidelines (federal, state, and local) as if they had a permit. Therefore, the process of identifying discharge limits is almost identical to obtaining a permit.

Estimated Costs for Alternative 4:

Direct Capital Costs:	$8,074,000
Annual O&M Costs:	$540,000
Total Periodic Costs:	$300,000
Total Present Value:	$14,883,000
Estimated Construction Time:	9 months

2.10 - Comparative Analysis of Alternatives

As required by CERCLA, nine criteria were used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. This section of the ROD profiles the relative performance of each alternative against the nine criteria, noting how they compare to the other options under consideration. The nine evaluation criteria are discussed below. The "Detailed Analysis of Alternatives" can be found in the FS Report. Table 10 provides a summary of this evaluation.

The nine criteria fall into three groups: threshold criteria, primary balancing criteria, and modifying criteria. Threshold criteria, which include overall protection of human health and the environment and compliance with ARARs, are requirements that each alternative must meet to be eligible for selection. Primary balancing criteria, which include long-term effectiveness and permanence; reduction of toxicity, mobility, or volume of contaminants through treatment; short-term effectiveness; implementability; and cost; are used to weigh major tradeoffs among alternatives. Modifying criteria, which include state/support agency acceptance and community acceptance, can be fully considered only after public comment is received on the Proposed Plan; therefore, modifying criteria were not evaluated in the FS. In the final balancing of trade-offs between alternatives, upon which the final remedy selection is based, modifying criteria are of equal importance to the balancing criteria.

2.10.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or ICs.

EPA is required to select remedies that will protect human health and the environment. All the retained alternatives – with the exception of the "No Action" alternative – would protect human health and the environment. Because the "No Action" alternative would not protect human health and the environment, it was eliminated from consideration and will not be discussed further under the remaining eight criteria. For all remaining alternatives, all the RAOs would be achieved upon successful treatment of the groundwater plume. The discussion below summarizes how the remaining alternatives for each area would achieve protectiveness.

Immediate risk reduction is provided by all the retained alternatives, except Alternative 1 (No Action). In the short-term, ICs would be used to ensure that potable use of groundwater continues to be prohibited until RAOs are achieved. If necessary, verification of municipal water supply use of all properties in and near the contaminated plume will be performed. In the long-term, protection of human health will be achieved once groundwater PRGs are met throughout the MCA plume.

2.10.2 Compliance with ARARs

Section 121(d) of CERCLA and NCP § 300.430(f)(l)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be applicable or relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all the applicable or relevant and appropriate requirements of federal and state environmental statutes or provides a basis for invoking a waiver. Alternatives 2a, 2b, 2c, 3, and 4 all comply with applicable ARARs. The primary ARARs to be met relate to reducing PCE and TCE concentrations in groundwater to below their PRGs and proper management and disposal of waste generated during the remedial action. Specific ARARs are listed in Table 11.

2.10.3 Long-term Effectiveness and Permanence

Long-term effectiveness and permanence refer to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

All of the remaining alternatives evaluated for the Site are considered proven and effective remedial alternatives for VOC-contaminated groundwater sites such as the MCA Site.

Alternatives 2a, 2b, 2c, and 3 are all likely to significantly reduce contaminant mass in the source area(s) rather rapidly (within 1 year of implementation), although a repeat application of reagents may be needed for Alternatives 2a, 2b, and 2c. Alternative 3 is the most effective in terms of immediate reduction of residual risks. Alternative 4 should reduce contaminant concentrations leaving the source area in a similar timeframe to alternatives 2a, 2b, 2c, and 3. However, contaminant reductions within the source area will take significantly longer. In addition, there is a potential to re-contaminate the aquifer should the pump and treat system fail or be turned off for any reason. Therefore, Alternative 4 has a greater potential for long term residual risks. This area is vulnerable to increased risk from tornadoes, severe thunderstorms, and flooding. As such, in situ Alternatives 2a, 2b, and 2c are more effective in the long term with no on-site above ground components.

While these alternatives would ultimately result in reduction of contaminant levels in groundwater such that levels would allow for unlimited use and unrestricted exposure, it is anticipated that it would take longer than five years to achieve these levels. As a result, in accordance with CERCLA, reviews would be required at least every five years to evaluate the effectiveness of any of the selected alternatives because groundwater at concentrations above health-based levels for unrestricted use. See CERCLA Section 121(c), 42 U.S.C. Section 9621(c), and 40 C.F.R. 300.430(f)(4)(ii).

2.10.4 Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Treatment Processes

Alternatives 2a, 2b, and 2c all directly treat the contaminants, destroying them in situ. Alternative 3 can also directly destroy contaminants in situ but may transfer them to another media (such as activated carbon) as part of the off-gas treatment, prior to their destruction. Alternative 4 is anticipated to use air stripping as a primary means of removing contaminants from water, transferring the contaminants from one media to another. If needed to comply with ARARs, the air from air stripping would be treated prior to discharge, otherwise, it would be released to the atmosphere and natural atmospheric processes would destroy the contamination.

Amount of contaminants that will be destroyed

The amount of contaminants expected to be destroyed is greatest with Alternative 3. Alternatives 2a, 2b, and 2c are all likely to destroy similar amounts of contaminants to one another, and slightly fewer contaminants than Alternative 3. Alternative 4 will also destroy contaminants, but likely fewer contaminants than the other alternatives (Except Alternative 1) and at a slower rate.

Degree of expected reduction in toxicity, mobility, or volume and specification

Successful implementation of Alternatives 2a, 2b, 2c, 3, and 4 requires a thorough pre-design investigation to locate the discrete source area(s) to be targeted for treatment. Assuming the source area(s) are located, Alternatives 2a and 2b (as defined in the FS), if not properly designed and implemented, have the potential to only partially treat contaminants, leaving some more toxic compounds such as vinyl chloride behind. Alternative 2c, however, also includes other measures (the activated carbon) which can capture contaminants. Alternative 2b, because of the speed of the reactions, has the potential to leave residual contamination with no residual treatment capability.

The subsurface volume treated is likely to be greatest for Alternative 3, because it is more difficult to treat small, separate area(s) with this technology. This also means that the location of the contamination does not need to be as specific as Alternatives 2a, 2b, and 2c. Alternative 4 would only extract and treat groundwater as it is leaving the source area at the Baker Feed property and would therefore treat far less volume in the subsurface. Through its many years of expected operations, Alternative 4 would likely treat a much greater volume of groundwater to achieve similar results.

Degree of irreversibility

The treatment provided by Alternatives 2a, 2b, 2c, 3, and 4 is irreversible. However, Alternative 3 is less likely to have "rebound" and require a second application than Alternatives 2a, 2b, or 2c. Though treatment provided by Alternative 4 is irreversible, residual groundwater contamination is likely to disperse should the pump and treat system be shut down for any reason.

Type and quantity of residuals

Properly designed and implemented, no toxic residuals should be produced from the treatment provided by Alternatives 2a, 2b, 2c, 3, or 4. However, Alternatives 2a, 2b, and 2c if not properly designed, are more likely to create toxic residuals.

2.10.5 Short-term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.

Protection of Community

Alternatives 2a, 2b, 2c, 3, and 4 all present similar risks to the community which can be mitigated using common approaches. However, ISCO uses strong oxidizers, which, while safe if handled properly, provide slightly more risk to the community than the reagents used for Alternatives 2a and Alternative 2c (as described) should there be an accident in chemical handling. Alternative 3 includes additional risks to immediate businesses and infrastructure from soil heating that would require mitigation. Alternative 4 requires long-term permanent infrastructure improvements (extraction wells, conveyance piping, treatment system, and potentially discharge piping) which creates more potential impact to the community, although much of the infrastructure is likely to be underground.

Protection of Workers

Alternatives 2a, 2b, 2c, and 3 are all expected to have similar levels of risk to the workers due to construction activities. Alternative 2b adds risk from the oxidizing reagent, which can be dangerous if mishandled. Alternative 4 is anticipated to have a somewhat longer construction period, due to the need to construct the treatment system, and therefore, based on time, poses slightly greater risk to workers than Alternatives 2a, 2b, 2c, or 3. With properly executed Health and Safety Plans, the risks to workers for all of the options are minimal.

Environmental Impacts

Alternatives 2a and 2c would also have low impacts on the environment and very similar impacts as their implementation is very similar. Alternative 2b, while similar in implementation to Alternatives 2a and 2c, potentially has more impact because of the use of a dangerous substance (the oxidizing regent) which, if mishandled or spilled, can pose a threat to the environment. Alternatives 3 and 4 have additional impacts to the environment, due to the electrical power needed to operate the systems.

Time required to Implement Remedial Action and Achieve RAOs

Alternatives 2a, 2b, 2c, 3, and 4 are all expected to achieve RAO 1 (Prevent unacceptable human health risk and hazard due to contact) in the same time period, because the process for achieving RAO 1 via ICs and verification that there are no drinking water wells in the contaminated plume is identical. Alternatives 2a, 2b, 2c, and 3 are all expected to take a similar amount of time to implement and achieve RAOs 2 and 3 (Restore the Milford Contaminated Aquifer to its beneficial use and Prevent migration of constituents of concern concentrations above PRGs from the Baker Feed Property to the municipal wellfield) because they all use a similar approach (treating the source area(s) and allowing the rest of the plume to dissipate on its own). Alternative 4 is expected to take longer to achieve RAO 2 than the other active alternatives. The restoration of the plume downgradient of the source area(s) near the Baker Feed property should take the same amount of time for Alternatives 2a, 2b, 2c, 3, and 4 because they all take measures to prevent contaminated water from migrating from the source area. Alternative 4 may need to be operated longer than Alternatives 2a, 2b, 2c, and 3 due to the slow process of contaminants desorbing/flushing from the source area(s) during the pump and treat operations.

2.10.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Technical Feasibility

Alternatives 2a, 2b, 2c, and 3 are all technically feasible and have been successfully used at other sites. All of the alternatives face some of the same challenges (the inadequate characterization of the discrete source area(s) for targeted treatment) which would be remedied by a robust pre-design investigation. Alternatives 2a, 2b, and 2c also face unique challenges, from geochemistry considerations (competing demands from non-contaminants on treatment reagents, aquifer physical properties) but these can all be mitigated in the design phase. Alternative 3 faces fewer of these challenges. Alternative 4, while successful at some sites, has also not achieved success at other sites despite being operated for many years.

Administrative Feasibility

Alternatives 2a, 2b, 2c, and 3 are all expected to have similar administrative feasibility (excluding cost considerations, which is evaluated separately). Alternative 4 is likely to have additional administrative challenges, due to the long-term O&M requirements.

Availability of Required Resources

Alternatives 2a, 2b, 2c, and 4 all use resources which are readily available. Alternative 3 uses a combination of resources which are readily available and also uses some key components (the specific heating system) which are proprietary and, while available, not as common. With Alternative 3, it may not be possible to change vendors, should issues arise.

2.10.7 Cost

An overview of the cost analysis performed for this evaluation and the detailed breakdowns for each of the alternatives are presented in Appendix B of the FS report. Total Present Value costs are summarized below:

Alternative 1	Alternative 2a	Alternative 2b	Alternative 2c	Alternative 3	Alternative 4
$0	$3.6 million	$2.1 million	$3.3 million	$13.6 million	$14.9 million

2.10.8 State/Support Agency Acceptance

This criterion considers the state's position and key concerns about the preferred alternatives and other alternatives identified in the Proposed Plan.

As the state support agency, the Ohio EPA supports the selection of Alternative 2c for the Site and has concurred with the Selected Remedy. The State's concurrence letter is provided in Attachment 4 and has been added to the Administrative Record.

2.10.9 Community Acceptance

This criterion considers the community's support of, reservations about, or opposition to the preferred alternatives and other alternatives identified in the Proposed Plan.

Based on the comments received during the public comment period, the community generally expressed support for the preferred remedy for the Site. EPA's response to the public comments is included later in this ROD, in *Part III – Responsiveness Summary*.

2.11 - Principal Threat Waste

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or acts as a source for direct exposure. Contaminated groundwater generally is not considered to be a source material. Source materials may be considered either principal threat wastes or low-level threat wastes. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. Low-level threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of release. Low-level threat wastes include source materials that exhibit low toxicity, low mobility in the environment, or are near health-based levels.

EPA has not identified any principal threat wastes at the Site. Instead, the contaminated groundwater and any source material are considered low-level threat waste materials.

2.12 - Selected Remedy

Based on the evaluation of alternatives described in Section 2.10 above, EPA has selected Alternative 2c: In Situ Treatment – Combined Remedy (Exposure pathway elimination, ICs, in situ treatment via combined approaches near source area, monitoring) as the Selected Remedy for the Site.

The following major components are included in the Selected Remedy:

- Treatment of groundwater using a combination of several approaches (to be determined after pre-design investigation) near the presumed source area near Baker Feed.
- Installation of a PRB located west of the Baker Feed Property.
- ICs to prohibit the private potable use of groundwater until RAOs are achieved within the MCA plume.
- Verification that properties within and near the plume are presently connected to the municipal water supply, which will continue to be treated by the City to achieve MCLs.
- Institutional and engineering controls (such as signs, fencing, etc.) necessary to protect public safety during construction and, if applicable, operation of the remedy. Additional ICs and engineering controls will be included, as applicable, to protect components of the remedy (such as force mains moving contaminated groundwater). The specific controls will be decided during the design phase.
- A pre-design investigation with the objective of better characterizing the source area(s) and providing information necessary for design. This investigation is anticipated to include soil and groundwater sampling, MW installation and sampling, and analyses (for VOCs and other parameters such as grain size), alternative-specific analyses (such as but not limited to measuring oxidant or reductant demand, measuring specific bacteria, and or nutrient needs).
- Installation of a monitoring network for the long-term monitoring of the plume. It is anticipated that both existing and new MWs (and municipal wells) may be part of the network. The network's primary purpose is monitoring the untreated portion of the plume downgradient of the Baker Feed property to assure that cleanup levels will be met. PCE concentrations greater than the cleanup levels (up to 15 µg/L) are present between the Baker Feed property and the municipal wellfield and no known additional source has been identified. TCE concentrations above the cleanup levels have not been identified in this area. The RI indicates that groundwater travels from the Baker Feed property to the municipal wellfield in approximately five months. Therefore, it is anticipated that groundwater located in the area between the Baker Feed property and the municipal wellfield will meet cleanup levels within approximately six months after source area treatment. In the meantime,

groundwater above the PCE cleanup level that travels to the municipal wellfield will be captured and treated by the existing air stripper.

2.12.1 <u>Summary of Estimated Remedy Costs</u>

The estimated total present worth cost of implementing the Selected Remedy at the Site is $3,301,000. This is based on anticipated capital costs of $2,746,000 and total O&M costs of $554,000. A detailed cost estimate for the Selected Remedy is provided in Table 12. These are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project cost. The cost estimate is based on the best available information regarding the anticipated scope of the remedial alternatives. Changes in the cost elements are likely to occur based on new information and data collected during the engineering design of the remedial alternatives. Major changes in the remedial action cost may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences, or a ROD amendment.

2.12.2 <u>Expected Outcomes of Selected Remedy</u>

The primary objective for the Selected Remedy is to reduce the potential for ingestion of COCs in groundwater above MCLs through treatment of affected media.

At the completion of the remedial action (i.e., when construction of the injections and PRB is complete), the Site will still be subject to use restrictions, including prohibitions against on-site installation of drinking water wells. These use restrictions are necessary because human health risks will not be reduced to acceptable levels until the remedy is complete (estimated to take 2.75 years).

After completion of the remedial action, land use at the Site is not expected to differ significantly from current land use. The Baker Feed property will remain non-residential, but portions of the property may be redeveloped in the future. Future land use within residential areas is expected to remain the same.

<u>Cleanup Levels</u>
The cleanup levels for the Milford Site are the same as the PRGs developed in the FS and presented in the December 2021 Proposed Plan. PRGs are considered preliminary until final cleanup levels are selected in a ROD. The final cleanup levels for the Site are based both on protective risk-based concentrations associated with current and reasonably anticipated future land uses (described earlier in this ROD) and a review of federal and state ARARs.

The cleanup levels were established for purposes of defining the extent of "contaminated" groundwater to which the groundwater RAOs identified in Section 2.8 applies. Since Ohio EPA has adopted the federal MCLs as their drinking water criteria, the federal and state standards are identical.

The groundwater cleanup levels are shown in the table below.

Cleanup Levels for Groundwater

COC	MCL (µg/L)
cis-1,2-dichloroethene	70
trans-1,2-dichloroethene	100
1,1-dichloroethene	7
Tetrachloroethene	5
Trichloroethene	5
Vinyl Chloride	2

<u>Anticipated Community Impacts</u>
Implementation of the Selected Remedy will reduce to acceptable levels the current and future risks to human health and the environment posed by the Site. Implementation of the Selected Remedy will also result in eventual discontinued use of the air stripper at the water treatment plant, which could positively impact the local economy. Potential short-term impacts during implementation of the remedy are discussed in Section 2.10.5.

2.13 - Statutory Determinations

Under CERCLA § 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the toxicity, mobility, or volume of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the Selected Remedy meets these statutory requirements.

Protection of Human Health and the Environment
The Selected Remedy provides overall protection of human health and the environment from impacted groundwater. Protection of human health and the environment will be achieved through treatment of low-level threat waste. Institutional controls will continue to be implemented to restrict untreated groundwater for potable use. The Selected Remedy will reduce exposure levels to protective ARAR- or risk-based cleanup levels, reducing risks to within EPA's generally acceptable risk range of 10^{-4} to 10^{-6} for carcinogenic risk and below the HI of 1 for non-carcinogens. The Selected Remedy also will provide adequate protection of the environment.

No unacceptable short-term risks are anticipated by implementation of the remedy. Some short-term risks (such as increased traffic, general construction, noise, etc.) will be created, but these risks can be minimized through proper mitigative measures during construction. EPA intends to work with the local community and property owners in developing a plan that would strive to minimize adverse impacts related to noise and traffic during the cleanup. In addition, no adverse cross-media impacts are expected from the Selected Remedy.

Compliance with Applicable or Relevant and Appropriate Requirements
The Selected Remedy will comply with all federal and state ARARs. The ARARs are presented in detail in Table 11. Table 11 also includes "to be considered" (TBC) information that does not constitute ARARs but that will be appropriately considered during implementation of the remedy.

Cost-Effectiveness
The Selected Remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (NCP § 300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of the Selected Remedy was determined to be proportional to its estimated present worth cost of $3,301,000, so the Selected Remedy represents a reasonable value for the money to be spent and is cost-effective. The Selected Remedy provides the greatest effectiveness proportional to its cost as compared to the other alternatives that meet all threshold criteria.

Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable
EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against off-site treatment and disposal and considering State and community acceptance.

The Selected Remedy treats the source of groundwater contamination, providing a permanent solution for the low-level threat waste at the Site. The Selected Remedy also treats groundwater leaving the source area, and therefore does not present short-term risks different from the other alternatives. It is anticipated any implementability concerns regarding geochemistry at the Site will be addressed during the design phase.

Preference for Treatment as a Principal Element
The Selected Remedy satisfies the statutory preference for treatment as a principal element of the remedy (i.e., treatment to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants is a principal element of the remedy).

Five-Year Review Requirements
Because this remedy may result in hazardous substances, pollutants, or contaminants remainingon-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

2.14 - Documentation of Significant Changes

The Proposed Plan for the Milford Site was released for public comment in December 2021. The Proposed Plan identified Alternative 2c as the Preferred Alternative. EPA reviewed all written and verbal comments submitted during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

PART III – RESPONSIVENESS SUMMARY

In accordance with CERCLA Section 117, 42 U.S.C. Section 9617, EPA released the Proposed Plan and Administrative Record for the Milford Site on December 8, 2021, and held a public comment period from December 8, 2021, through January 7, 2022, to allow interested parties to comment on the Proposed Plan. Due to COVID-19 restrictions, EPA held a virtual-format public meeting on December 15, 2021, instead of an in-person public meeting to avoid in-person contact. EPA made this decision in accordance with the Centers for Disease Control guidance urging the postponement of mass gatherings. In addition, EPA posted an online, pre-recorded presentation describing the Proposed Plan. The presentation was available to the public throughout the comment period and contained the same information that would have been presented during an in-person meeting.

This Responsiveness Summary provides both a summary of the public comments EPA received regarding the Proposed Plan and EPA's response to those comments. EPA received written comments via the comment form available on EPA's web page, via handwritten mailed correspondence, and via electronic mail. EPA received substantive comments from three concerned citizens.

EPA is required by law to consider and address only those comments that are pertinent and significant to the remedial action being selected. EPA is not required to address comments that pertain to the allocation of liability for the remedial action nor potential enforcement action to implement the remedial action, as these matters are independent of the selection of the remedial action and EPA's Proposed Plan. Additionally, EPA is not required to reprint verbatim the comments received and may paraphrase where appropriate. In this Responsiveness Summary, EPA has included large segments of the original comments. However, persons wishing to see the full text of the comments should refer to the commenters' submittals to EPA, which have been included in the Administrative Record. A written transcript of the virtual public meeting is also included in the Administrative Record. The Administrative Record index is provided in Attachment 3.

<u>Public Comments and EPA Responses</u>

1) One commenter expressed opinions on the various remedial alternatives, how they would implement them, and their preferred alternative. They suggest that EPA determine acceptable levels in soil samples. They recommend removing soil and installing a PRB and treating the removed soil with one of the reagents identified in Alternatives 2a, 2b, or 2c. They recommend using the Site as a temporary recycling area and to treat the soil until soil levels are acceptable. They also recommend adding a percolation system to expedite this process. They recommend estimating how many years cleanup will take and reference the Hanford Site located along the Columbia River in southeastern Washington. They also recommend using horizontal drilling techniques to determine the extent of contamination and potentially use this technique to extract the volatiles. The commentor prefers Alternative 3.

EPA Response: EPA's Selected Remedy includes installation of a PRB. Soil located beneath an existing structure cannot be removed for structural reasons. Therefore, soil excavation is not a viable remedial alternative. The FS includes cleanup timeframe estimates. EPA's Selected Remedy has an estimated remedial timeframe of less than 1 year once implemented. However, more information is required to refine this estimate. The reference to the Hanford Site is unclear. Horizontal drilling may be used as part of the Selected Remedy. However, this will be determined during the design phase.

2) One commenter provided questions regarding EPA's Selected Remedy. The questions included:
   a) Will the EPA proposed solution (2c) eliminate the need/operation/cost of the existing air stripper?
   b) How will the estimated cost for 2c ($3.3 million) be funded?
   c) The Baker Feed Property has recently sold with new commercial activity in process. Is this a solution searching for a problem? It's not like this is a brownfield that's been undeveloped since 1986; in fact it's quite the contrary.
   d) Is the possibility of "residual contamination" worth the risk?
   e) Are there any documented, reliable data since 1986 of any adverse health effects?

EPA Responses:

a) EPA's Selected Remedy is intended to reduce groundwater contamination to below federal and state drinking water criteria, eventually eliminating the need for the existing air stripper.

b) The costs for remediation at the Site are being federally funded. The State of Ohio will, as appropriate, provide a 10% match to the remedial costs for construction and getting the remedy operational. Once remedy construction is complete and operational, the State of Ohio will assume the costs of Operation & Maintenance of the remedy. These costs are not passed on to the City of Milford or their residents.

c) EPA's Selected Remedy will not significantly impact the existing commercial activity. EPA will work with the existing property owner during the remediation process. Restoration of groundwater to beneficial use is an agency-wide goal and this proposed remediation is aimed to be a solution to this problem. An additional benefit of this proposed remediation is the discontinuation of the air stripper, resulting in savings to the City of Milford and its residents.

d) The residual contamination present at the Site is a risk to future residents who would drink untreated groundwater. Once the residual contamination is treated and groundwater concentrations are below federal and state drinking water criteria, this risk will no longer be present.

e) Groundwater concentrations documented in the Remedial Investigation Report and included in this ROD demonstrate that adverse health effects are present if groundwater were to be ingested without treatment.

3) One commenter suggested that Alternative 3 is the best for their community because that remedial alternative has a shorter completion time, is most effective for immediate risk reduction, does not require re-application, has no risk of system failure, is expected to eliminate the greatest amount of contamination, is less likely to create residual contamination, and has been successful at other sites without the geochemical challenges present for Alternatives 2a, 2b, and 2c.

   EPA Response: As required by CERCLA, nine criteria were used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. The criteria and a summary of the evaluation of Alternative 2c and Alternative 3 are provided below:

Explanation of the Nine Evaluation Criteria

Threshold Criteria

1. ***Overall Protection of Human Health and the Environment*** addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed by the Site are eliminated, reduced, or controlled through treatment, engineering, or institutional controls. **Both Alternatives 2c and 3 have been proven effective for risk reduction, although Alternative 3 has been proven to be more effective (generally). It should be noted that no current risk from groundwater ingestion is present (drinking water is treated to remove groundwater contamination prior to distribution), and this remedial action is designed to eliminate the need for a water treatment system to remove groundwater contamination and future risk.**

2. ***Compliance with Applicable or Relevant and Appropriate Requirements*** addresses whether a remedy will meet all ARARs of federal and state environmental statutes and/or justifies a waiver. **Both Alternatives 2c and 3 will meet ARARs.**

Primary Balancing Criteria

3. ***Long-Term Effectiveness and Permanence*** refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion also incorporates an evaluation of climate resilience. **Both Alternatives 2c and 3 are expected to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. Any residual contamination from Alternative 2c is expected to be minimal and treated with downgradient PRB. Re-application for Alternative 2c is not required but may be needed to achieve RAOs. Note that the costs associated with Alternative 2c include the potential re-application.**

4. ***Reduction of Toxicity, Mobility, or Volume through Treatment*** addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility, or volume of the hazardous substances as a principal element. **The amount of contamination anticipated to be eliminated through treatment is estimated to be similar between Alternative 2c and Alternative 3, as both are anticipated**

to eliminate contamination to achieve RAOs.

5. ***Short-Term Effectiveness*** addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction of the remedy until cleanup levels are achieved. **The estimated completion time difference between Alternative 2c and Alternative 3 is negligible (1.25 years).**

6. ***Implementability*** addresses the technical and administrative feasibility of a remedy from design through construction, including the availability of services and materials needed to implement a particular option, and coordination with other governmental entities. **Alternative 3 has a greater risk of system failure than Alternative 2c. A "system" is not installed for Alternative 2c. Geochemical concerns with implementation of Alternative 2c are anticipated to be minimal.**

7. ***Cost*** includes estimated capital and annual O&M costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in today's dollar value. Cost estimates are expected to be accurate within a range of +50 percent to -30 percent. **The cost for Alternative 2c is approximately $10 million less than Alternative 3.**

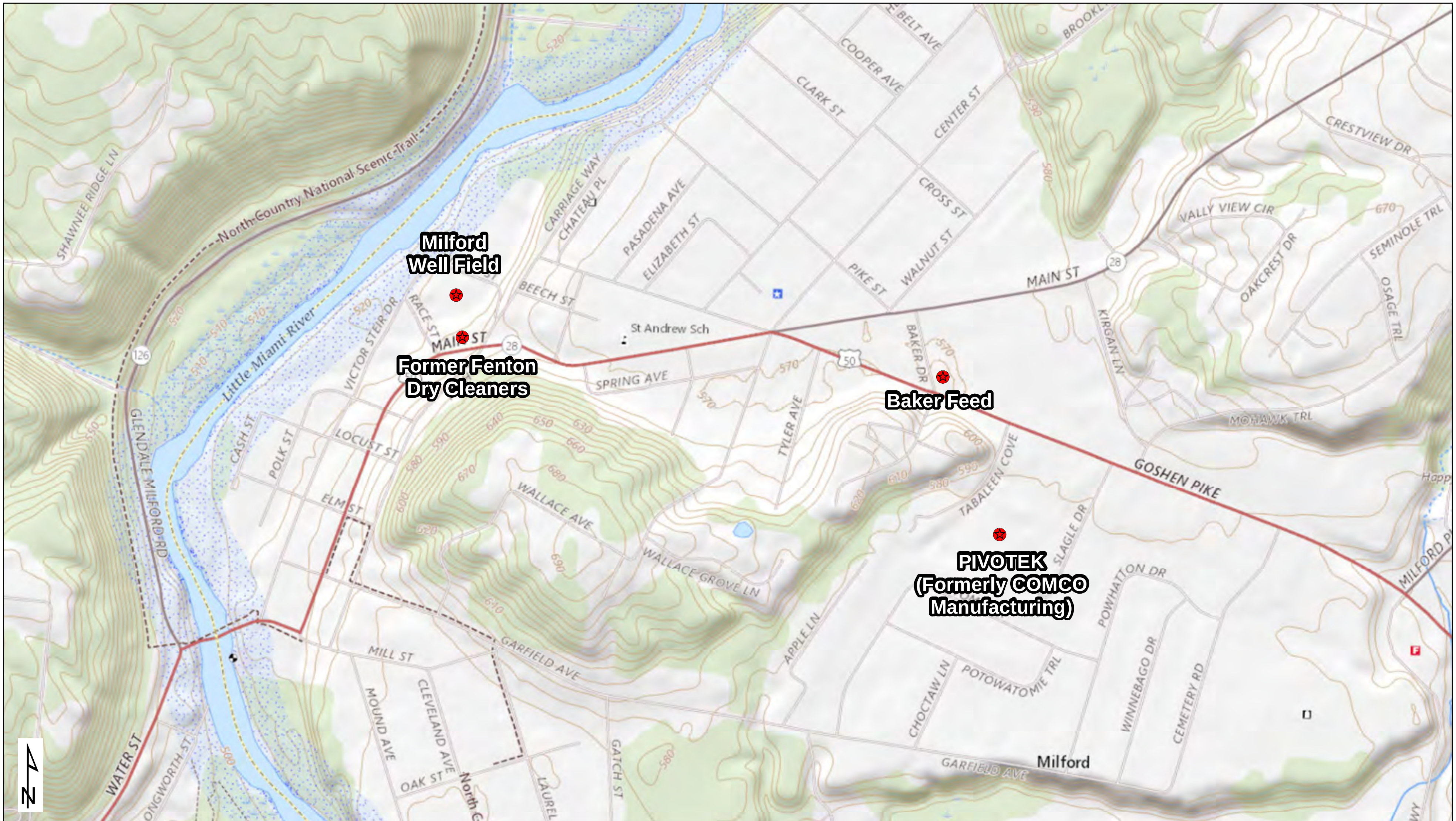
<u>Modifying Criteria</u>

8. ***State Agency Acceptance*** considers whether the state support agency concurs with, opposes, or has no comment on the Preferred Alternative presented in the Proposed Plan. **The Ohio EPA has concurred with the Selected Remedy. The State's concurrence letter is provided in Attachment 4 and has been added to the Administrative Record.**

9. ***Community Acceptance*** considers whether the public agrees with EPA's analyses of the Preferred Alternative described in the Proposed Plan. **EPA has received minor comments from the public regarding the Selected Remedy.**

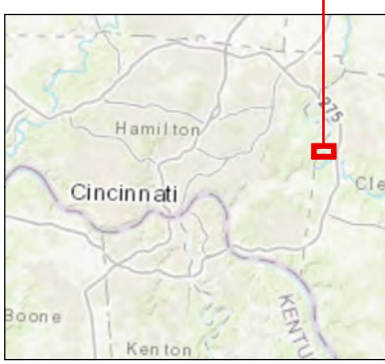
Based on an evaluation of all nine criteria, Alternative 2c was selected.

ATTACHMENT 1:
FIGURES



0 375 750 1,125 1,500 Feet

Background Source: USGS The National Map



MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT CO, OH

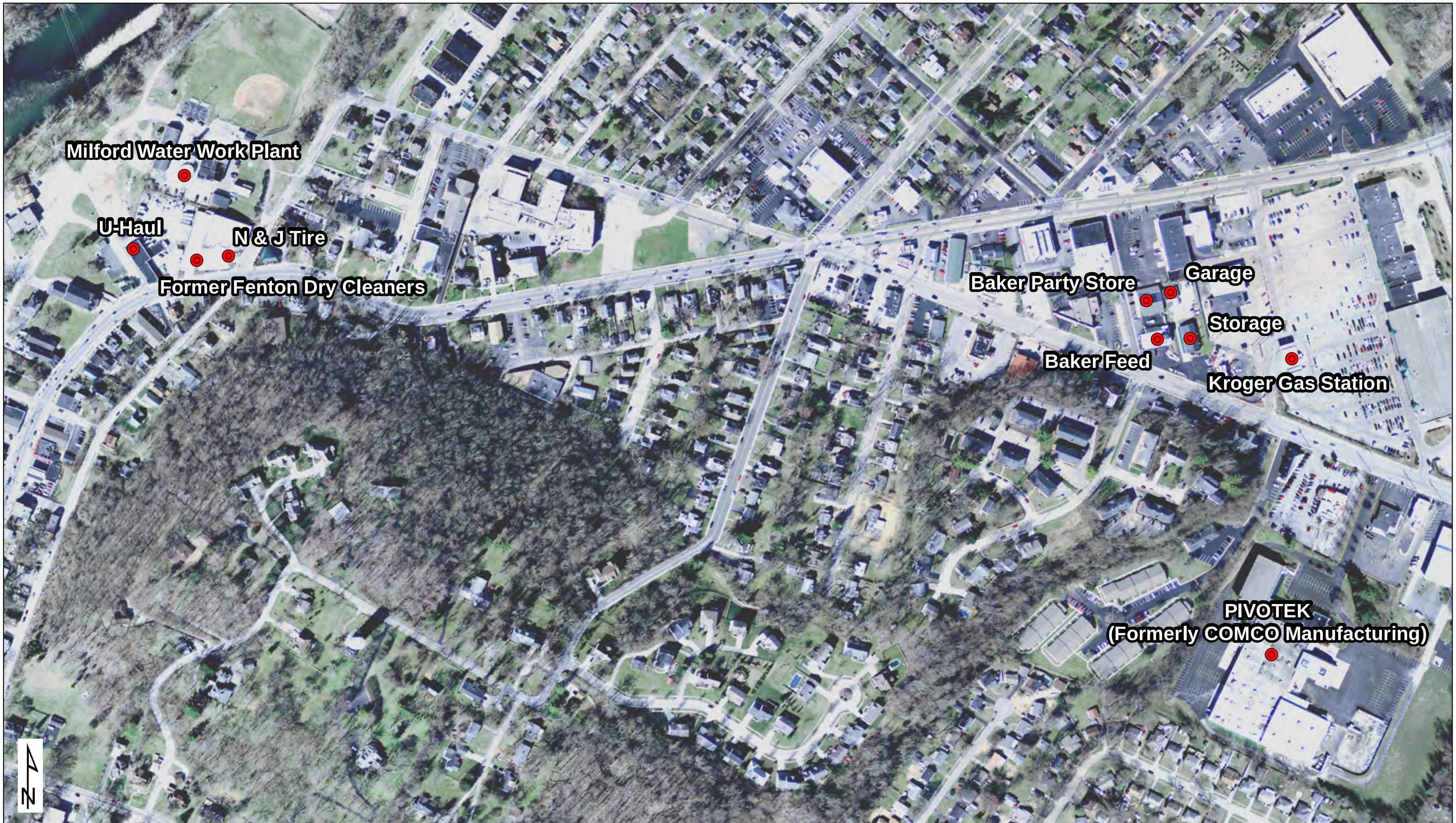
FIGURE 1

SITE LOCATION MAP

EPA REGION 5 RAC 2 | REVISION 0 | DECEMBER 2020

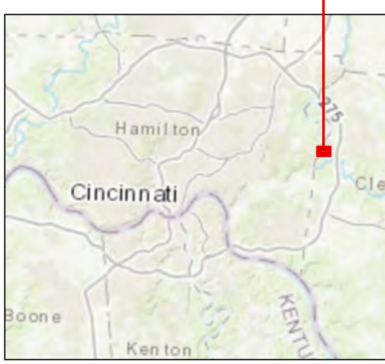
SulTRAC

document path: C:\Users\jshepherd\Projects\Milford\FS Figures\Figure 1-1 - Site Location.mxd author: JBergman



0 200 400 600 800 Feet

Imagery Source: State of Ohio GISSC / ESRI
Imagery Date: 2017



MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT CO, OH

FIGURE 2

SITE LAYOUT MAP

EPA REGION 5 RAC 2 | REVISION 0 | DECEMBER 2020

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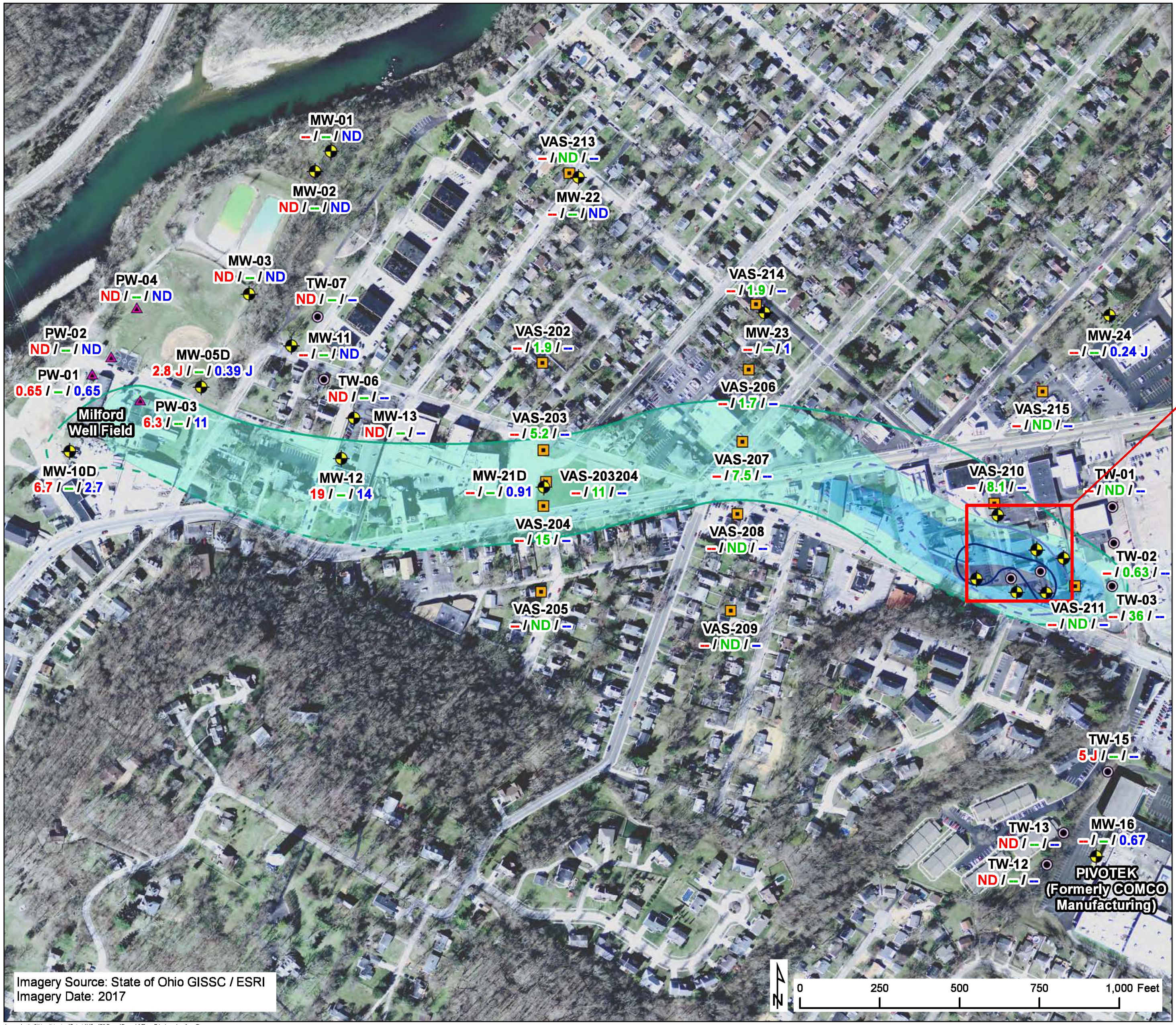
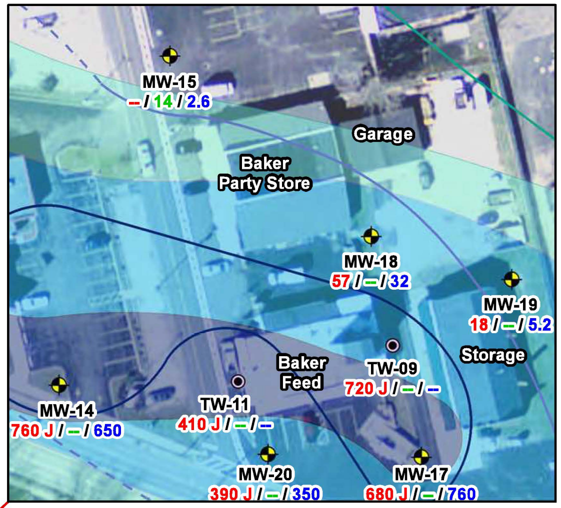
document path: C:\Users\jshepherd\Projects\Milford\FS Figures\Figure 1-2 - Site Layout.mxd author: JBergman





Sampling Locations

- Monitoring Well
- Temporary Well
- Public Water Supply Well
- Vertical Aquifer Sampling

2013 Plume Approximate Extent

- > 5 µg / L (dashed where inferred)
- > 50 µg / L (dashed where inferred)
- > 500 µg / L (dashed where inferred)

2019 Plume Approximate Extent

- > 5 µg / L
- > 50 µg / L
- > 500 µg / L

Notes:
ND – Not Detected
J – Estimated Concentration

All locations are approximate

Labels

Concentrations from:
2013 / 2016 / 2019

Example:
MW-15
– / 14 / 2.6
– - not sampled in 2013
14 - 2016 concentration
2.6 - 2019 concentration

MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT CO, OH

FEASIBILITY STUDY

FIGURE 3
ESTIMATED EXTENT OF TETRACHLOROETHENE PLUME

EPA REGION 5 RAC 2 | REVISION 0 | DECEMBER 2020

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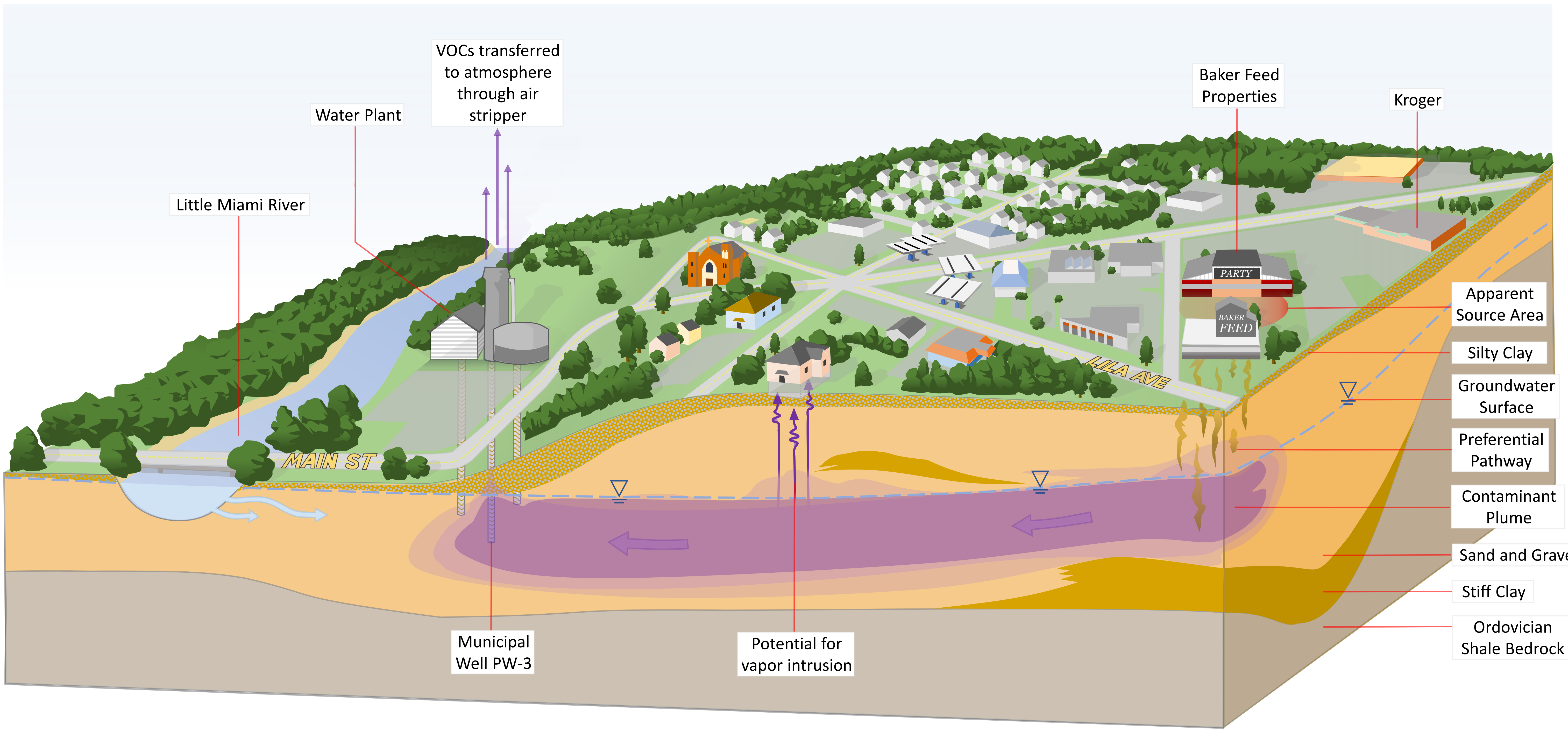

MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT CO, OH

FIGURE 4

CONCEPTUAL SITE MODEL

EPA REGION 5 RAC 2 | REVISION 1 | OCTOBER 2020

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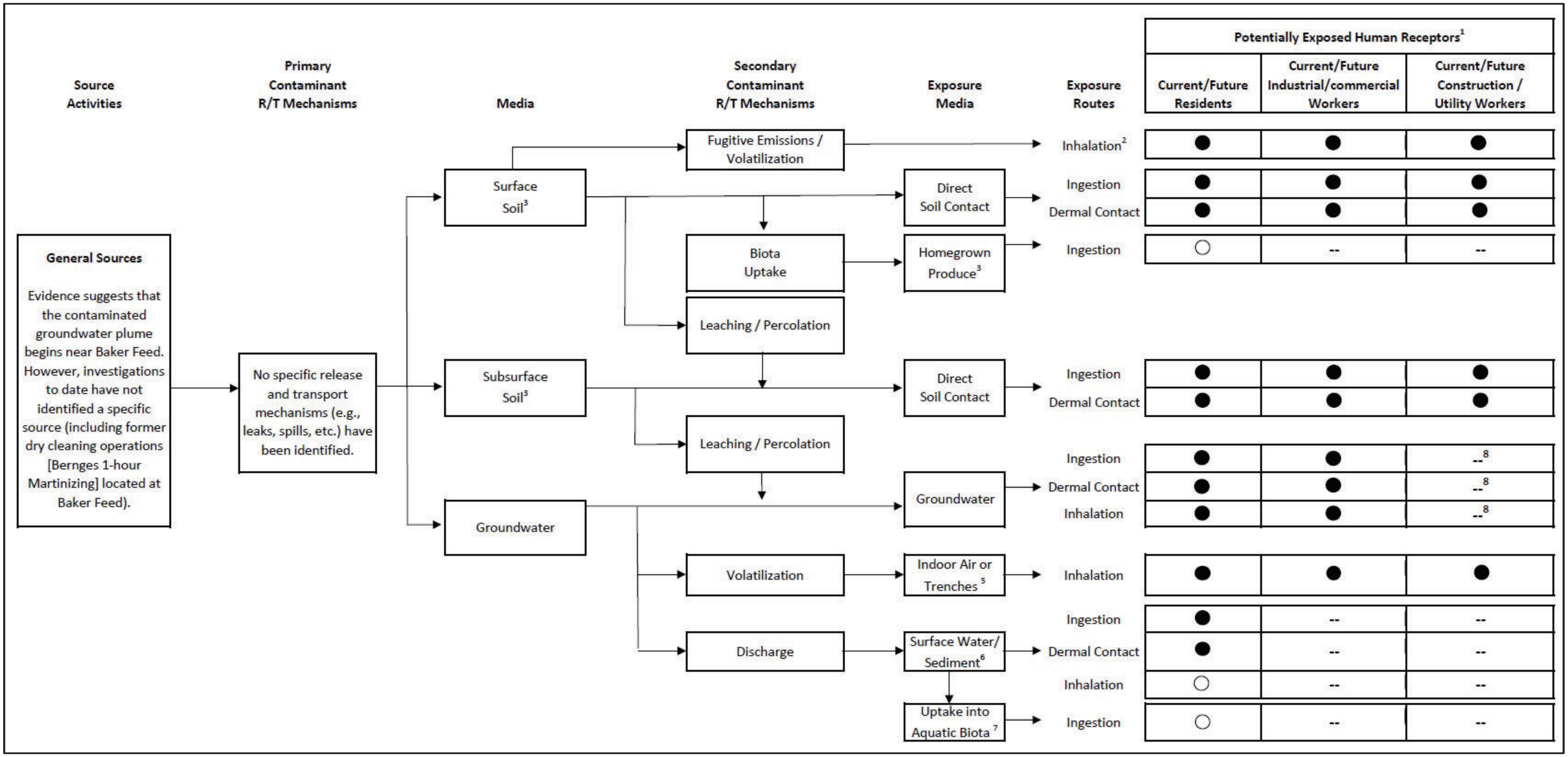


LEGEND

● Potentially complete exposure pathway retained for quantitative evaluation
-- Incomplete or negligible exposure pathway, not retained for evaluation
○ Potentially complete, but insignificant exposure pathway; not retained for evaluation

1 The land use above the contaminated aquifer is primarily a mix of residential and industrial/commercial properties. The identified receptors represent the primary receptor types associated with this type of mixed use.

2 This exposure route also applies to subsurface soil brought to the surface in the future as the result on intrusive activities and landscaping.

3 Volatile organic compounds (VOC) were only infrequently detected in soil at low concentrations.

4 As stated in Footnote 2, VOCs were only infrequently detected in soil at low concentrations. Also, VOCs are not expected to significantly accumulate in home grown produce. The Agency for Toxic Substances and Disease Registry (ATSDR) notes that "chemicals with small Kow (octanol-water partition coefficients) values tend to partition in mostly air and water" (ATSDR 1993). Therefore, VOCs tend to be widely distributed in air and exposure via the food chain is of less concern than other exposure pathways. Therefore, potential exposure via ingestion of homegrown produce will be addressed only qualitatively.

5 Shallow soil gas concentrations indicate that potential exposure via the vapor intrusion pathway into overlying buildings or trenches/excavations is likely to be insignificant. Nonetheless, these exposures will be quantified consistent with evaluation of a VOC-contaminated aquifer.

6 It is assumed that some residents will engage in recreational activities in and along the Little Miami River near and downstream of the point where the contaminated aquifer plume is estimated to discharge into the river.

7 The potential for VOC uptake into fish is expected to be minimal. The ATSDR notes that "chemicals with small Kow values tend to partition in mostly air and water" (ATSDR 1993). Therefore, VOCs tend to be widely distributed in air and exposure via the food chain is of less concern than other exposure pathways. Therefore, potential exposure via fish ingestion will be addressed only qualitatively.

8 The depth to groundwater at the Milford site is ≥ 18 feet below ground surface (bgs). Construction and utility excavations are typically assumed to be only 8 to 10 feet bgs. Therefore, groundwater will not accumulate in any constuction and utility excvations resulting in no direct contact exposure to groundwater.

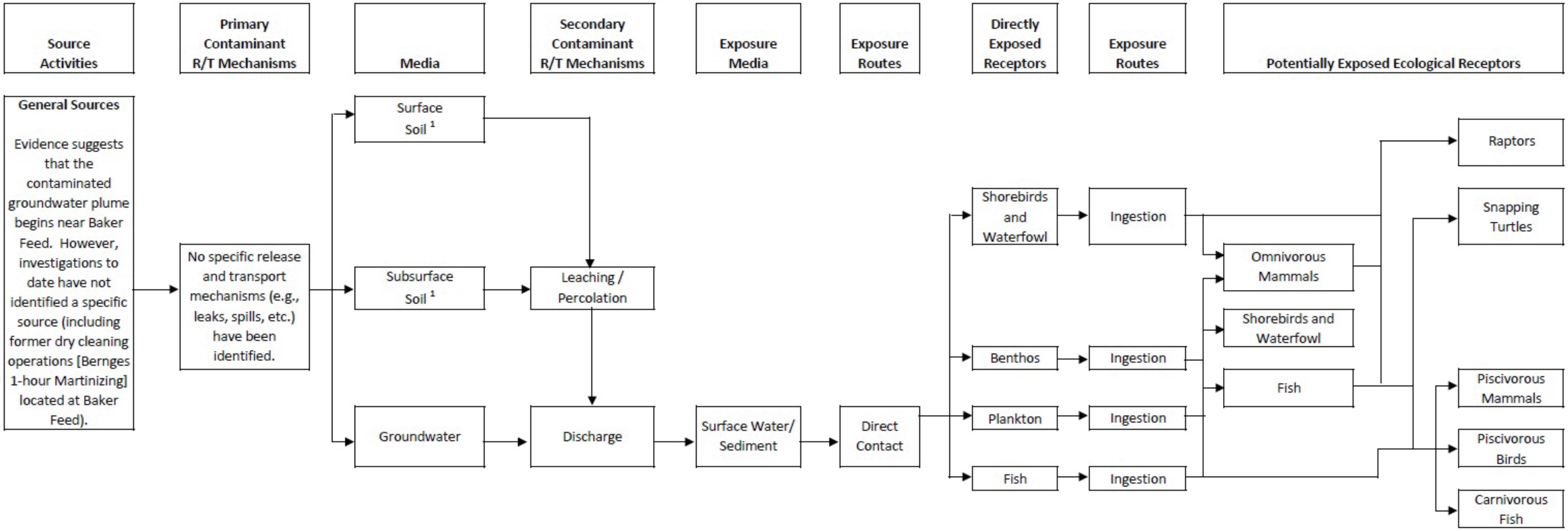
MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT CO, OH

FIGURE 5

HUMAN HEALTH CONCEPTUAL SITE MODEL

DECEMBER 2019

SulTRAC



Notes:

R/T Release/transport

1 The land use above the contaminated aquifer is a mixture of residential and industrial/commerical land use. Therefore, there is no terrestrial ecological habitat. As a result, the only potentially complete ecological exposure pathways are to surface water and sediment.

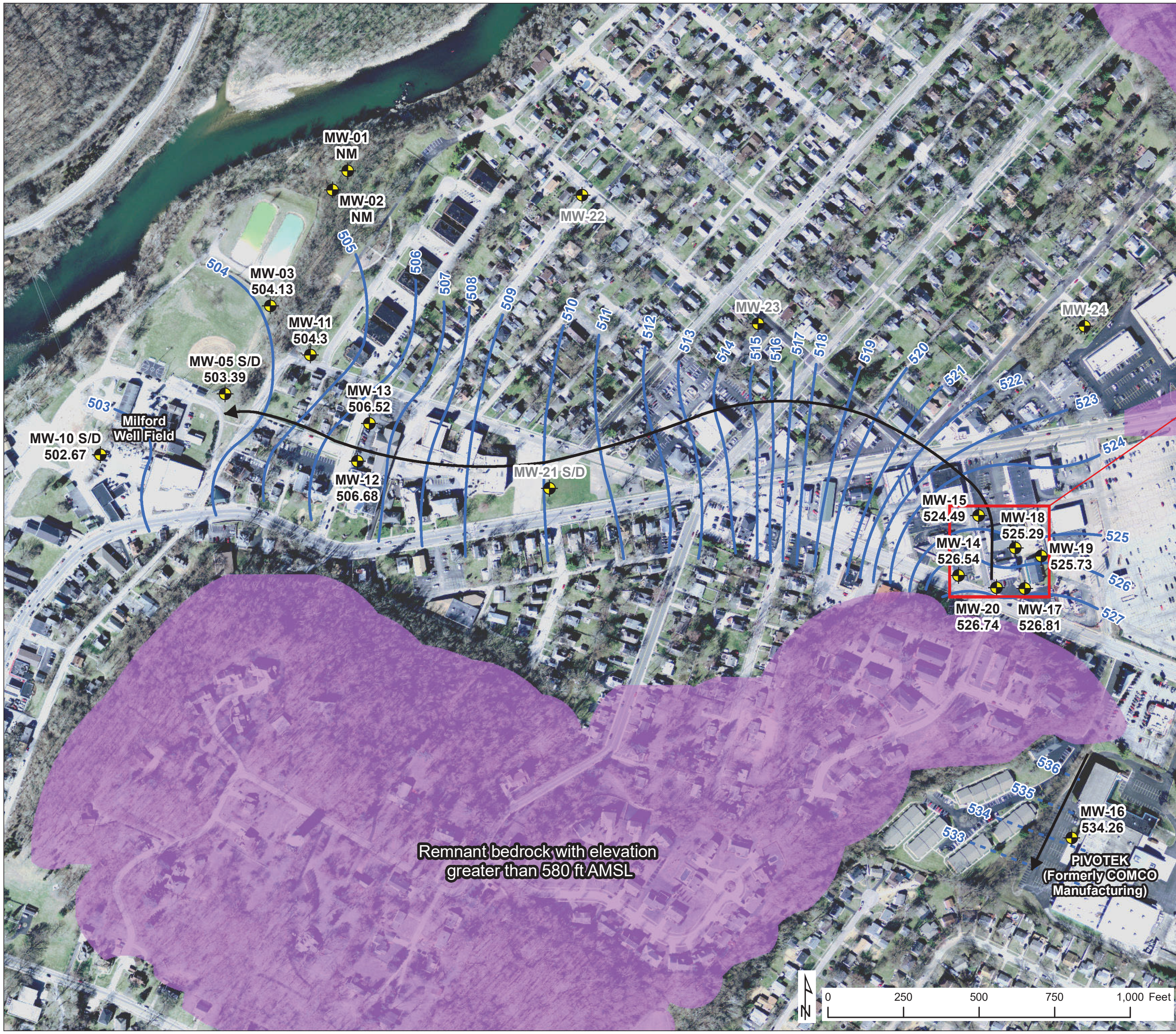
MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT CO, OH

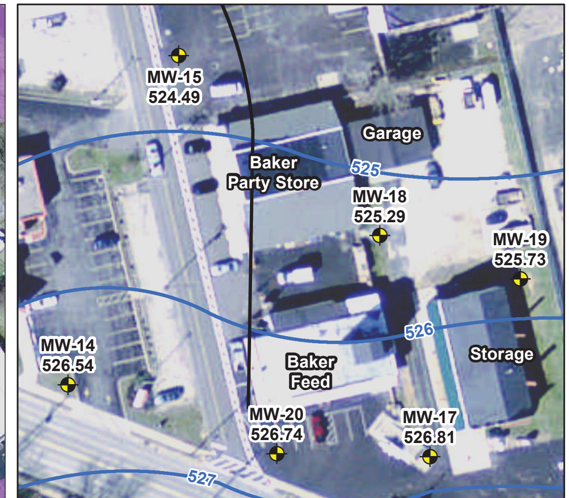
FIGURE 6

ECOLOGICAL CONCEPTUAL SITE MODEL

DECEMBER 2019

SulTRAC





Sampling Locations

- Monitoring Well
- Groundwater Elevation Contour
- Data from April 10, 2014 Survey
- Groundwater Flow Direction

Notes:
All measurements are in feet AMSL
AMSL = Above Mean Sea Level
NM = Not Measured

All locations are approximate

Imagery Source: State of Ohio GISSC / ESRI
Imagery Date: 2017

Labels
Example:
MW-15 - Well ID
524.49 - Well Elevation

MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT CO, OH
REMEDIAL INVESTIGATION

FIGURE 7
POTENTIOMETRIC SURFACE MAP
AUGUST 30, 2013

EPA REGION 5 RAC 2 | REVISION 1 | OCTOBER 2020

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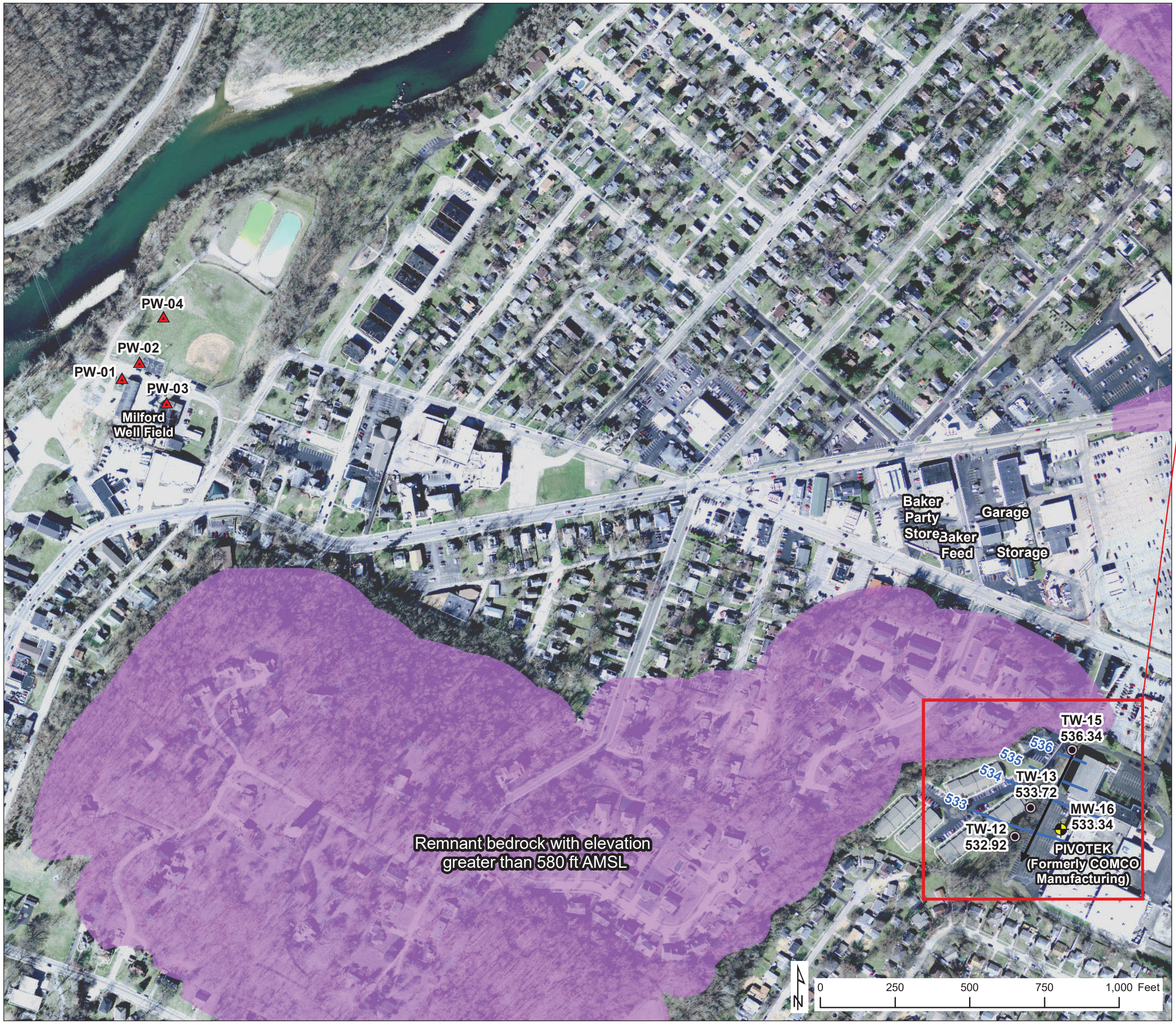


Sampling Locations

- Monitoring Well
- Temporary Well
- Public Water Supply Well
- Groundwater Elevation Contour
- Groundwater Flow Direction

Notes:
All measurements are in feet AMSL
AMSL = Above Mean Sea Level
NM = Not Measured

All locations are approximate

Imagery Source: State of Ohio GISSC / ESRI
Imagery Date: 2017

Labels

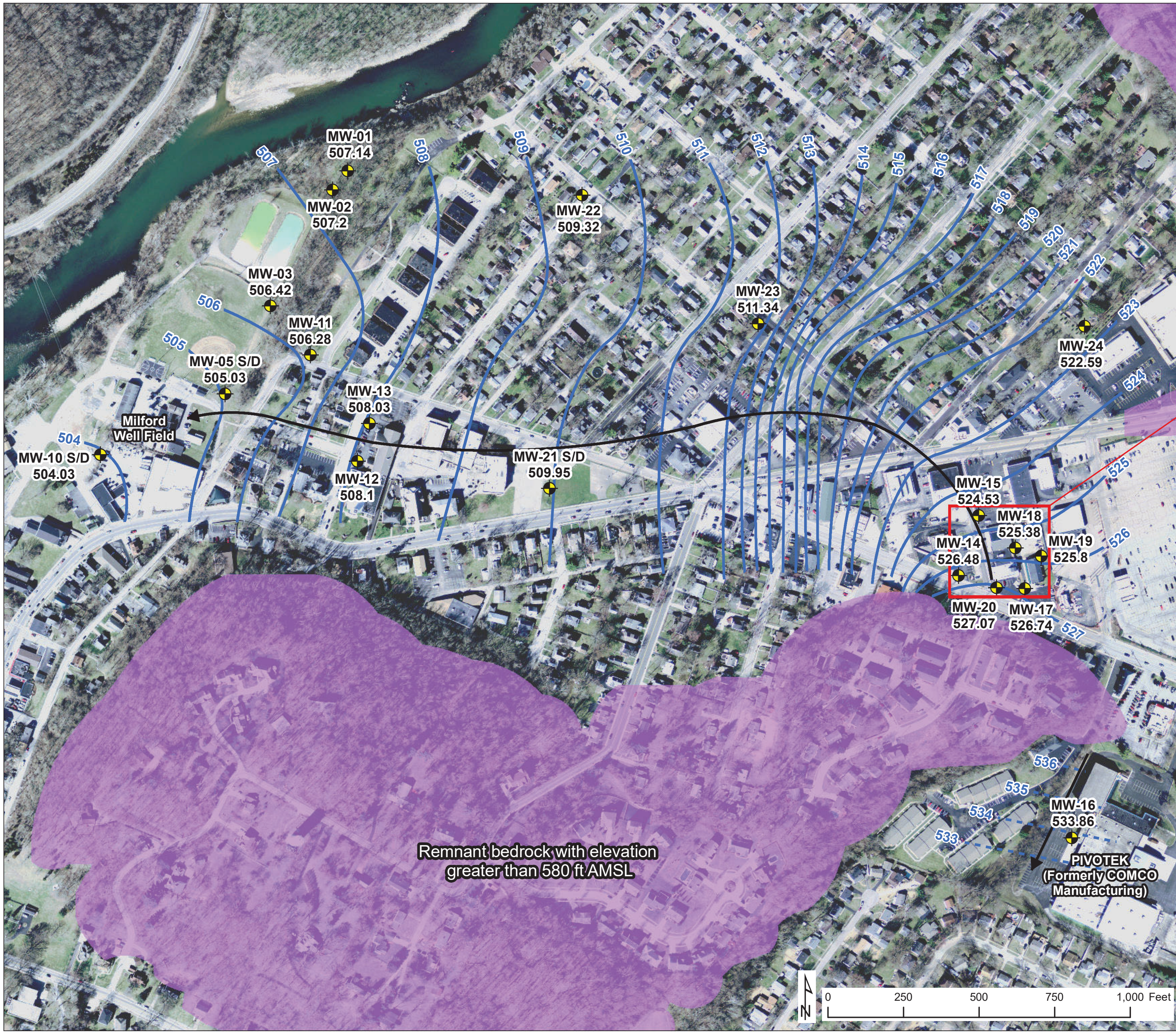
Example:
MW-16 - Well ID
533.34 - Well Elevation

MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT CO, OH
REMEDIAL INVESTIGATION

FIGURE 8
POTENTIOMETRIC SURFACE MAP
APRIL 10, 2014

EPA REGION 5 RAC 2 | REVISION 1 | OCTOBER 2020

ST SulTRAC



Sampling Locations

- Monitoring Well
- Groundwater Elevation Contour
- Data from April 10, 2014 Survey
- Groundwater Flow Direction

Notes:
All measurements are in feet AMSL
AMSL = Above Mean Sea Level
NM = Not Measured

All locations are approximate

Imagery Source: State of Ohio GISSC / ESRI
Imagery Date: 2017

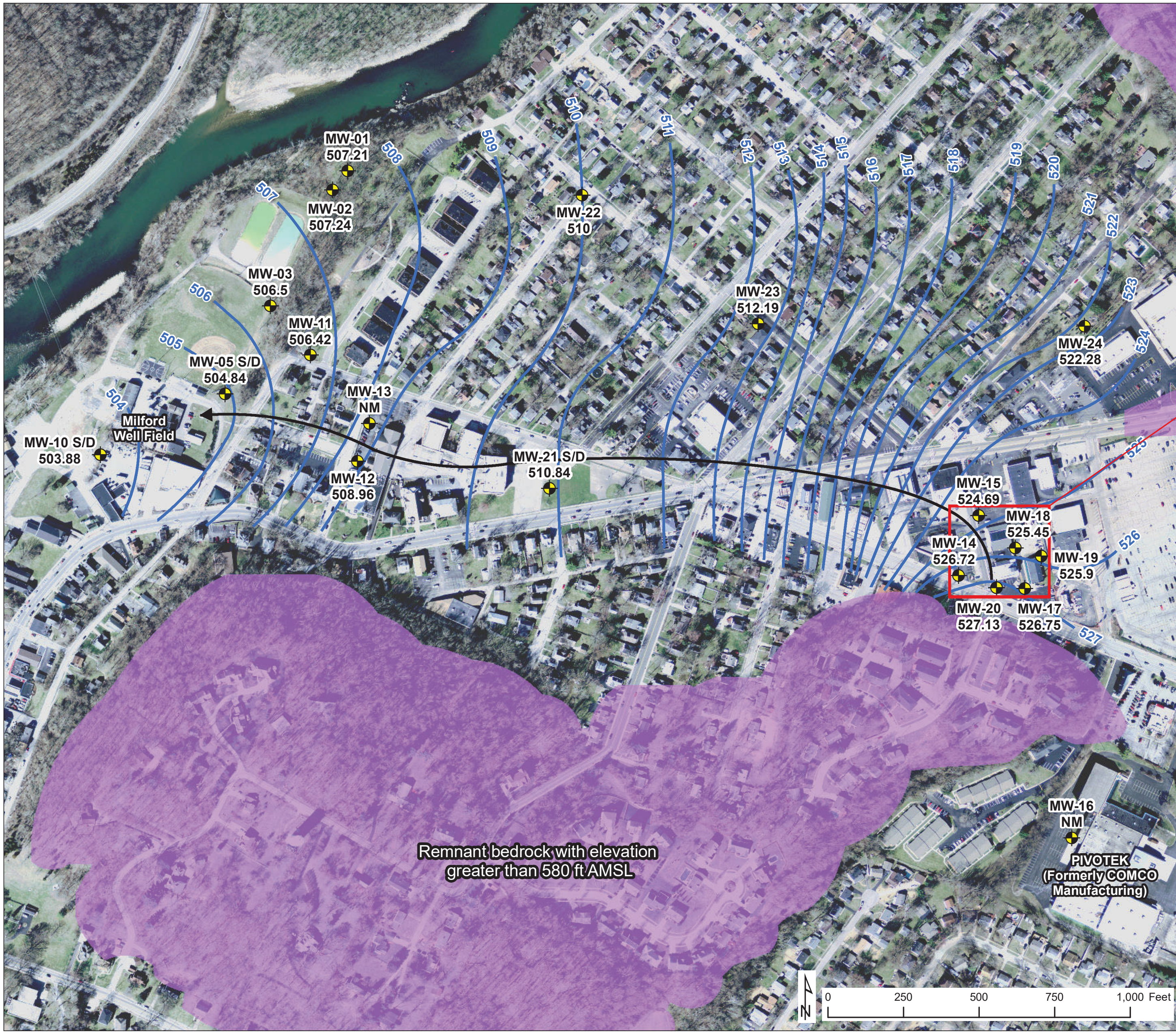
Labels
Example:
MW-15 - Well ID
524.53 - Well Elevation

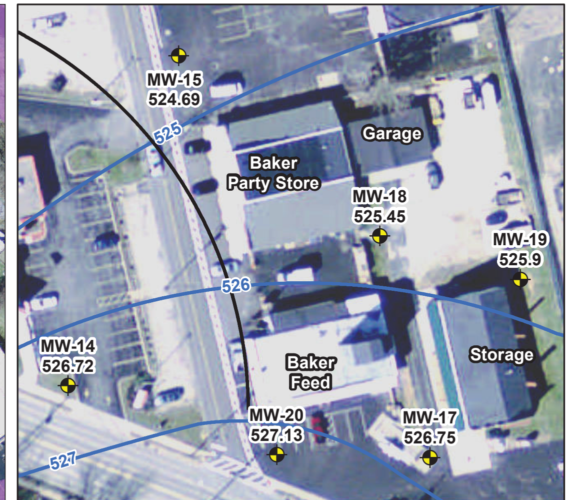
MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT CO, OH
REMEDIAL INVESTIGATION

FIGURE 9
POTENTIOMETRIC SURFACE MAP
APRIL 21, 2017

EPA REGION 5 RAC 2 | REVISION 1 | OCTOBER 2020

ST SulTRAC





Sampling Locations

- Monitoring Well
- Groundwater Elevation Contour
- Groundwater Flow Direction

Notes:
All measurements are in feet AMSL
AMSL = Above Mean Sea Level
NM = Not Measured

All locations are approximate

Imagery Source: State of Ohio GISSC / ESRI
Imagery Date: 2017

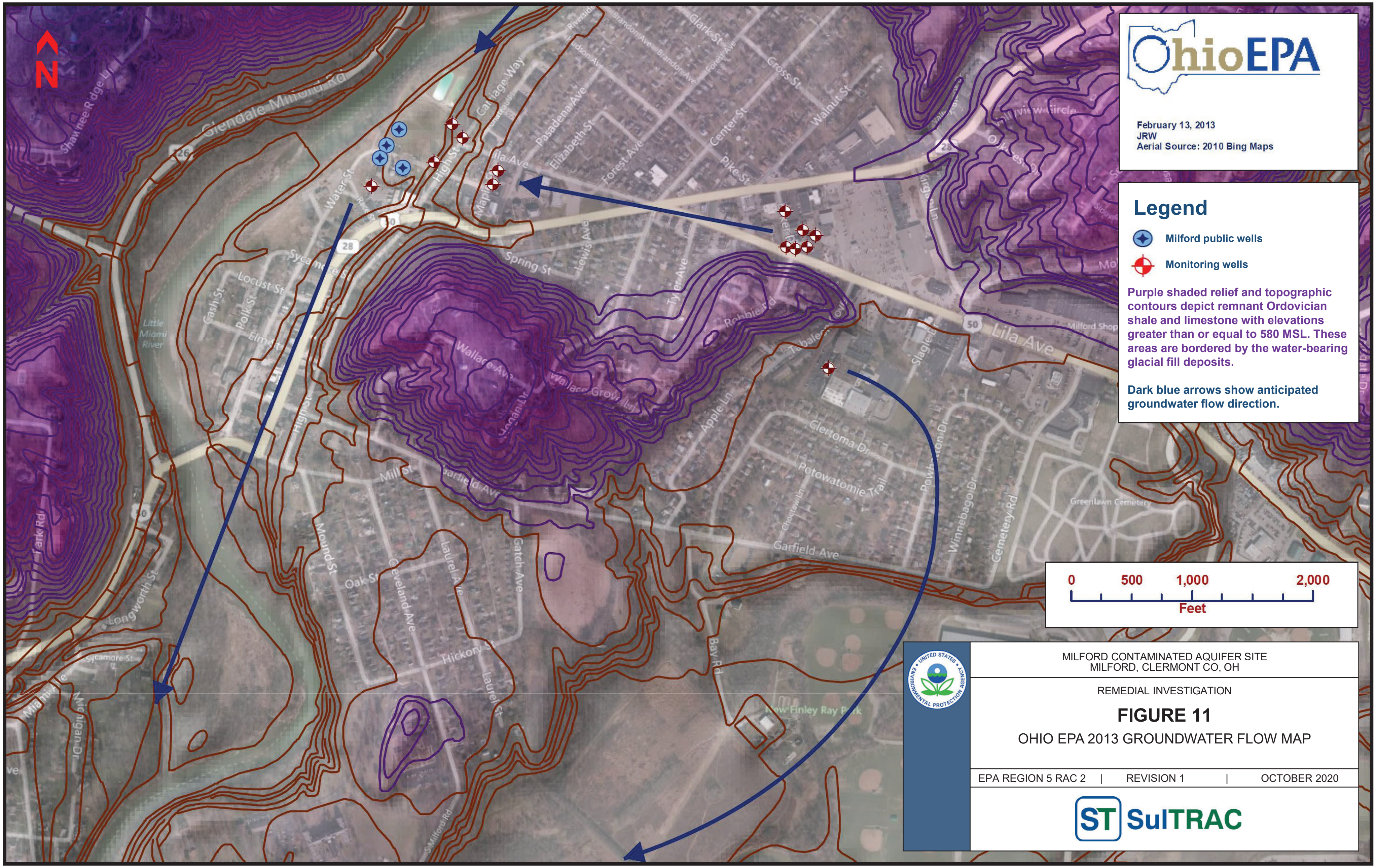
Labels
Example:
MW-15 - Well ID
524.69 - Well Elevation

MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT CO, OH
REMEDIAL INVESTIGATION

FIGURE 10
POTENTIOMETRIC SURFACE MAP
MARCH 27, 2018

EPA REGION 5 RAC 2 | REVISION 0 | OCTOBER 2020

ST SulTRAC



Source: Adapted from unpublished 2013 Ohio Environmental Protection Agency (OEPA) document

ATTACHMENT 2:

TABLES

Table 1: Summary of Maximum Concentrations of Contaminants in Groundwater

Contaminant	Maximum Concentration (µg/L)[a]	Criterion (µg/L)	Type[b]
1,1,1-TCA	15	200	MCL
1,1-Dichloroethane	2	2.8	RSL
1,1-DCE	0.63	7	MCL
1,4-Dioxane	0.453	0.46	RSL
2-Butanone	10	5,600	RSL
2-Hexanone	3.1	38	RSL
Acetone	71	18,000	RSL
Benzene	0.55	5	MCL
Bromodichloromethane	3.1	80	MCL
Bromoform	3.6	80	MCL
Carbon Disulfide	0.22	810	RSL
Chloroform	8.3	80	MCL
Chloromethane	1.4	190	RSL
cis-1,2-DCE	50	70	MCL
Cyclohexane	86	13,000	RSL
Dibromochloromethane	5	80	MCL
Ethylbenzene	1.1	700	MCL
Isopropylbenzene	0.33	450	RSL
m,p-Xylene	0.72	190	RSL
Methylcyclohexane	1.9	NC	NC
Methylene chloride	0.26	5	MCL
Methyl-tert-butyl ether	22	14	RSL
o-Xylene	0.39	190	RSL
PCE	760	5	MCL
Toluene	1.2	1,000	MCL
trans-1,2-DCE	0.9	100	MCL
TCE	35	5	MCL

[a] Maximum concentration detected during EPA remedial investigations.

[b] Criteria is either the EPA's Maximum Contaminant Level (MCL) or EPA's November 2021 Tapwater Regional Screening Level (RSL). Ohio EPA has adopted MCLs as their drinking water standards

Table 2: Summary of Maximum Concentrations of Contaminants in Soil

Contaminant	Maximum Concentration (µg/kg)[a]	Criterion (µg/kg)	Type
1,1,1-TCA	1	70	MCL
1,2-Dichlorobenzene	1.2	580	MCL
1,4-Dichlorobenzene	2.4	72	MCL
2-Butanone	29	1,200	RSL
Acetone	89	3,700	RSL
Benzene	0.54	2.6	MCL
Carbon Disulfide	0.8	240	RSL
Chloroform	0.96	22	MCL
cis-1,2-DCE	0.96	21	MCL
Cyclohexane	0.16	13,000	RSL
Ethylbenzene	0.58	780	MCL
m,p-Xylene	0.84	190	RSL
Methylcyclohexane	0.33	NC	NC
Methylene chloride	5.7	1.3	MCL
o-Xylene	0.35	190	RSL
Styrene	0.29	110	MCL
PCE	1,100	2.3	MCL
Toluene	46	690	MCL
TCE	13	1.8	MCL
Trichlorofluoromethane	1	3,300	RSL

[a] Maximum concentration detected during EPA remedial investigations.

[b] Criteria is EPA's November 2021 Protection of Groundwater Screening Level – either MCL- or risk-based

Table 3: Summary of Maximum Concentrations of Contaminants in Soil Vapor

Contaminant	Maximum Concentration ($\mu g/m^3$)[a]	Criterion ($\mu g/m^3$)[b]
1,1,1-TCA	574	174,000
1,1,2-Trichlorofluoromethane	4.9	174,000
1,2,4-Trimethylbenzene	24.5	2,090
1,3,5-Trimethylbenzene	3.2	2,090
1,3-Dichlorobenzene	3.1	NC
2-Butanone	83.1	174,000
2-Propanol	46.3	6,950
Acetone	155	1,070,000
Benzene	37.8	12
Carbon Disulfide	60.7	24,300
Chloromethane	1.5	3,130
cis-1,2-DCE	1.6	NC
Dichlorodifluoromethane	18.8	3,480
Ethanol	490	NC
Ethylbenzene	35.9	37.4
m,p-Xylene	45.7	3,480
Methylene chloride	17.1	3,380
n-Heptane	69.5	13,900
n-Hexane	108	24,300
n-Propylbenzene	8.6	34,800
o-Xylene	19.6	3,480
PCE	1,140	360
Toluene	84.1	174,000
TCE	13.8	16
Trichlorofluoromethane	6.9	NC

[a] Maximum concentration detected during EPA remedial investigations.

[b] Default Vapor Intrusion Screening Level (VISL) for sub slab soil gas.

Table 4: Final Contaminants of Concern

Media	Receptor	Contaminant[1]
Groundwater	Future commercial/industrial worker	PCE TCE cis-1,2-DCE trans-1,2-DCE 1,1-DCE Vinyl Chloride
	Future resident	PCE TCE cis-1,2-DCE trans-1,2-DCE 1,1-DCE Vinyl Chloride

[1] cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and vinyl chloride are included as potential degradation products and have not been detected in groundwater above its MCL

TABLE 5

RISK AND HAZARD SUMMARY
MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT COUNTY, OHIO

Receptor	RAGS D Tables	Total Risk	Risk Drivers		Total HI	HI Drivers	
Current/Future Residents	7.1.RME	2E-06/ 2E-04 (GW)	Potable GW: 1.6E-04	**PCE** (6.8E-05) **TCE** (9.3E-05) **Chloroform** (2.8E-06)	0.02/ 200 (GW)	Potable GW: 180	**cis-1,2-Dichloroethene** (19) **PCE** (107) **TCE** (53)
			IA Modelled from GW VI: 5.2E-05	**Bromodichloromethane** (1.2E-06) **Chloroform** (6.6E-06) **PCE** (2.9E-05) **TCE** (1.5E-05)		IA Modelled from GW VI: 11	**PCE** (7.5) **TCE** (3.5)
			IA Modelled from SG VI: 1.9E-06	**Benzene** (1.9E-06)		IA Modelled from SG VI: 0.02	NA
Current/Future Industrial/ Commercial Workers	7.2.RME	4E-09/ 1E-05 (GW)	Potable GW: 1.2E-05	**PCE** (6.5E-06) **TCE** (5.4E-06)	5E-05/ 2 (GW)	Potable GW: 2.4	**PCE** (1.5)
			IA Modelled from GW VI: 1.1E-07	NA		IA Modelled from GW VI: 0.027	NA
			IA Modelled from SG VI: 4.4E-09	NA		IA Modelled from SG VI: 5.3E-05	NA
Current/Future Construction Workers	7.3.RME	6E-08 (GW)	GW	NA	0.4 (GW)	GW	NA
Current/Future Utility Workers	7.4.RME	5E-07 (GW)	GW	NA	0.1 (GW)	GW	NA
Current/Future Recreational Users	Table E-2-6[a]	No surface water samples were collected from the LMR. Therefore, as discussed in Section 2.5.2 of Appendix E, maximum contaminant concentrations measured in wells located close to the LMR were compared to surface water screening levels (see Table E-2-6). The only groundwater contaminants that exceeded surface water screening levels are PCE and TCE. See Section 2.5.2 of Appendix E for a detailed qualitative analysis of surface water.					

Notes:

[a]	This table is not in the RAGS D tables. It is one of the text tables.	PCE	Tetrachloroethene
(yellow highlight)	Risk ≥ 1E-06 or HI > 1	RAGS	Risk Assessment Guidance for Superfund
	Bolded chemical name identifies risk or hazard driver	RME	Reasonable maximum exposure
EPC	Exposure Point Concentration	SG	Soil Gas
GW	Groundwater	TCE	Trichloroethene
IA	Indoor Air	VI	Vapor Intrusion
HI	Hazard index		
LMR	Little Miami River		
NA	Not applicable		

Table 6: Human Health Risk Concentrations of COCs Greater than EPA's Acceptable Risk Range[1]

Exposure Point	Receptor	Route	Cancer Risk	Hazard Index	Major Contributor(s)		
					Contaminant of Concern	Cancer Risk	Hazard Quotient
Potable Groundwater	Future Resident	Ingestion	1.6E-04	180	PCE TCE cis-1,2-DCE	6.7E-05 9.2E-05 NA	107 52 19
	Future Industrial/Commercial Workers	Ingestion	1.2E-05	2.4	PCE TCE	6.5E-06 5.5E-06	1.5 NA

NA: Not Applicable

[1] Excludes indoor air risks modeled from soil gas and groundwater. Modeled indoor air concentrations were demonstrated to be inaccurate based on actual site data and vapor intrusion is not a site concern.

TABLE 7: EPA RAGS PART D TABLE 3, EXPOSURE POINT CONCENTRATION SUMMARY FOR POTABLE GROUNDWATER
MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT COUNTY, OHIO

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Potable Groundwater

Exposure Point	Analyte Group	Chemical of Potential Concern[e]	CAS Number	Units	Detection Frequency	Number of High Censored Results[d]	Arithmetic Mean [c]	95 UCL	Distribution	Maximum Concentration	(Qualifier)	Exposure Point Concentration			
												Value	Units	Statistic [a]	Method [b]
Groundwater	VOC	Benzene	71-43-2	µg/L	1/7	6	--	--		0.098	J	0.098	µg/L	Max	(1)
Groundwater	VOC	Bromodichloromethane	75-27-4	µg/L	1/7	6	--	--		0.13	J	0.13	µg/L	Max	(1)
Groundwater	VOC	Chloroform	67-66-3	µg/L	2/7	3	0.548	--		0.61		0.61	µg/L	Max	(1)
Groundwater	VOC	cis-1,2-Dichloroethene	156-59-2	µg/L	5/7	0	7.301	--		50		50	µg/L	Max	(1)
Groundwater	VOC	Dibromochloromethane[f]	124-48-1	µg/L	0/7	--	--	--		--		--	--	--	--
Groundwater	VOC	Methyl-tert-butyl ether	1634-04-4	µg/L	2/7	2	0.192	--		0.55	J	0.55	µg/L	Max	(1)
Groundwater	VOC	Tetrachloroethene	127-18-4	µg/L	7/7	0	229.5	--		760	J	760	µg/L	Max	(1)
Groundwater	VOC	Trichloroethene	79-01-6	µg/L	6/7	0	8.989	--		30		30	µg/L	Max	(1)

Abbreviations:

--	Not applicable, no estimate provided because there were fewer than 10 samples or less than four detected results
CAS	Chemical abstract service
COPC	Chemical of Potential Concern
EPA	U.S. Environmental Protection Agency
EPC	Exposure Point Concentration
KM	Kaplan-Meier
MAX	Maximum Detected Concentration
RAGS	Risk Assessment Guidance for Superfund
VOC	Volatile Organic Compounds
µg/L	Micrograms per liter
95 UCL	One-sided 95 percent upper confidence limit of the mean
(a)	The EPC is the lesser of the UCL and the maximum detected result. The maximum detected result is the default when there are fewer than 10 samples or less than four detected results.
(b)	All methods follow EPA (2015).
(c)	Arithmetic mean is KM mean when detection frequency is not 100% or maximum likelihood estimation mean when KM mean was not available.
(d)	Number of censored (nondetect) results that exceeded the maximum detected concentration. These results are excluded from statistical calculations.
(e)	The COPCs are based on a combination of potable groundwater COPCs and groundwater vapor intrusion COPCs. The intent is to reflect the full potential exposure, risks, and hazards associated with potential groundwater exposures via both potable and vapor intrusion pathways. As a result, benzene and MTBE (COPCs via vapor intrusion only) were added as potable groundwater COPCs.
(f)	Dibromochloromethane was identified as a COPC based on all the monitoring, potable, and shallow VAS wells, but was not detected in the seven selected wells for potable water.

Notes:

Method (Statistic) Codes are defined as follows (some method codes may not be used in the table):

(1) Maximum detected concentration

(2) 95 UCL calculated using the KM mean and a Student's t cutoff for the UCL

References:

EPA. 2002. "Calculating Exposure Point Concentrations at Hazardous Waste Sites." OSWER 9285.6-10. Office of Emergency and Remedial Response. Washington, D.C. December.

EPA. 2015. “ProUCL Version 5.1 Technical Guide.” Prepared by A. Singh and A.K. Singh. EPA/600/R-07/041. October. Available online at: https://www.epa.gov/land-research/proucl-version-5100-documentation-downloads

Table 8: Cancer Toxicity Data Summary

Pathway: Ingestion, Dermal						
Contaminant of Concern	**Oral Cancer Slope Factor**	**Dermal Cancer Slope Factor**	**Slope Factor Units**	**Weight of Evidence/Cancer Guideline Description**	**Source**	**Date**
PCE	2.10E-03	2.10E-03	$(mg/kg\text{-}day)^{-1}$	Likely Carcinogen	IRIS	November 2019
TCE	4.60E-02	4.60E-02	$(mg/kg\text{-}day)^{-1}$	Carcinogenic	IRIS	November 2019

Table 9: Ecological Assessment and Measurement Endpoints

Assessment Endpoint	Testable Hypothesis	Measurement Endpoint
Protect the benthic and aquatic communities in the LMR from the deleterious effects of acute and chronic exposures to site-related constituents present in the river.	Levels of COPECs in surface water and sediment are sufficiently available for biological uptake by benthic and aquatic communities in the LMR at levels which could cause adverse effects on the immediate and long-term health of the benthic and aquatic community.	Comparison of groundwater concentrations from locations adjacent to LMR to ecological surface water screening benchmarks for benthic and aquatic life for evaluation of likelihood of ecological risk.
Protect threatened and endangered species (including candidate species) and species of special concern and their habitats from the deleterious effects of acute and chronic exposures to site-related constituents.	Levels of COPECs in surface water are sufficiently available for biological uptake by threatened and endangered species (including candidate species) and species of special concern which could cause adverse effects on the short- and long-term health of the species community.	Comparison of groundwater concentrations from locations adjacent to LMR to ecological surface water screening benchmarks for benthic and aquatic life for evaluation of likelihood of ecological risk to threatened and endangered species (including candidate species) and species of special concern and their habitats.

COPEC = constituent of potential ecological concern

Table 10
Comparative Analysis - Remedial Alternatives
Milford Contaminated Aquifer Site
Milford, Clermont County, Ohio

Evaluation Criteria	Alternative 1 - No Action	Alternative 2a - In Situ Treatment - ISCR (Exposure Pathway Elimination, ICs, In Situ treatment with ISCR to treat source area(s))	Alternative 2b - In Situ Treatment - ISCO (Exposure pathway elimination, ICs, In Situ treatment with ISCO to treat source area(s))	Alternative 2c - In Situ Treatment - Combined Remedies (Exposure pathway elimination, ICs, In Situ treatment with combined remedy approach to treat source area(s))	Alternative 3 - In Situ Thermal Treatment (Exposure Pathway Elimination, ICs, In Situ Thermal Treatment of source area, monitoring)	Alternative 4 - Ex Situ Treatment - Pump and Treat (Exposure Pathway Elimination, ICs, Groundwater Pump and Treat System installed near source area, monitoring)
Overall protectiveness of human health and the environment	**Not Protective, Does not meet criteria.** No actions are taken to address risks.	**Protective, Meets Criteria.** Any immediate risks due to groundwater use are controlled by enforcement of existing ordinance prohibiting private wells. Long term protection is provided once contaminant levels within the plume are reduced through the use of in situ treatments at or near the presumed source area using chemcial reduction as a primary treatment mechanism, in addition to natural processes for the rest of the plume. Ecological risks have not been identified at the site.	**Protective, Meets Criteria.** Any immediate risks due to groundwater use are controlled by enforcement of existing ordinance prohibiting private wells. Long term protection is provided once contaminant levels within the plume are reduced through the use of in situ treatments at or near the presumed source area using chemcial oxidation as a primary treatment mechanism, in addition to natural processes for the rest of the plume. Ecological risks have not been identified at the site.	**Protective, Meets Criteria.** Any immediate risks due to groundwater use are controlled by enforcement of existing ordinance prohibiting private wells. Long term protection is provided once contaminant levels within the plume are reduced through the use of in situ treatments at or near the presumed source area using combined processes (could include activated carbon, chemical reduction, biological reduction, or other approaches) as a primary treatment mechanism, in addition to natural processes for the rest of the plume. Ecological risks have not been identified at the site.	**Protective, Meets Criteria.** Any immediate risks due to groundwater use are controlled by enforcement of existing ordinance prohibiting private wells. Long term protection is provided once contaminant levels within the plume are reduced through the use of an in-situ thermal treatment to cleanup contaminated aquifer materials and groundwater at the presumed source area (the vicinity of the Baker Feed property), in addition to natural processes for the portion of the plume located outside the treatment area. Ecological risks have not been identified at the site.	**Protective, Meets Criteria.** Any immediate risks due to groundwater use are controlled by enforcement of existing ordinance prohibiting private wells. Long term protection is provided once contaminant levels within the plume are reduced through the use of a pump-and-treat system to treat groundwater near the presumed source area (the vicinity of the Baker Feed property), in addition to natural processes. Ecological risks have not been identified at the site.
Compliance with ARARs	**Does not meet ARARs, Does Not Meet Criteria.**	**Complies with ARARs, Meets Criteria.** ARARs related to remedial construction activites (such as worker training, dust suppresesion, vehicle emissions, etc.) would be complied with by using appropriate personnel or equipment. Any ARARs which are process specific (such as DOT hazardous material regulations, and investigtion derived waste management) would be complied with by taking appropriate actions. The final outcome is expected to be an aquifer which meets MCLs for site related COCs.	**Complies with ARARs, Meets Criteria.** ARARs related to remedial construction activites (such as worker training, dust suppresesion, vehicle emissions, etc.) would be complied with by using appropriate personnel or equipment. Any ARARs which are process specific (such as DOT hazardous material regulations,and investigtion derived waste management) would be complied with by taking appropriate actions. The final outcome is expected to be an aquifer which meets MCLs for site related COCs.	**Complies with ARARs, Meets Criteria.** ARARs related to remedial construction activites (such as worker training, dust suppresesion, vehicle emissions, etc.) would be complied with by using appropriate personnel or equipment. Any ARARs which are process specific (such as DOT hazardous material regulations,and investigtion derived waste management) would be complied with by taking appropriate actions. The final outcome is expected to be an aquifer which meets MCLs for site related COCs.	**Complies with ARARs, Meets Criteria.** ARARs related to remedial construction activites (such as worker training, dust suppresesion, vehicle emissions, etc.) would be complied with by using appropriate personnel or equipment. Any applicable ARARs that are process specific (such as VOC emissions from the remedial system and investigation derived waste mangement) would be complied with using appropriate measures identifed during the design and construction phases. The final outcome is expected to be an aquifer which meets MCLs.	**Complies with ARARs, Meets Criteria.** ARARs related to remedial construction activites (such as worker training, dust suppresesion, vehicle emissions, etc.) would be complied with by using appropriate personnel or equipment. Any applicable ARARs that are process specific (such as VOC emissions from the remedial system, management of investigation derived waste, building codes (Assuming a "permanent" treatment building is built) would be complied with using appropriate measures identifed during the design and construction phases. The final outcome is expected to be an aquifer which meets MCLs.
Long-term effectiveness and permanence	**Does Not Meet Criteria.** **Residual risks:** No measures are taken to address any risks. **Adequacy of Reliability of Controls**: No controls are established for Alternative 1.	**Meets Criteria**. **Residual Risks**: If not properly implemented, could create more toxic byproducts than original contaminants. Properly implemented, no toxic byproducts should be generated. Significant reductions in source area concentrations expected within 1 year. May require reapplication to achieve goals. **Adequacy and Reliability of Controls**: ICs are similar for all alternatives except Alternative 1 and if enforced, adequate. Controls would no longer be needed once RAOs are achieved.	**Meets Criteria**. **Residual Risks**: Properly implemented, no toxic byproducts should be generated. Significant reductions in source area concentrations expected within 1 year. May require reapplication to achieve goals. **Adequacy and Reliability of Controls**: ICs are similar for all alternatives except Alternative 1 and if enforced, adequate. Controls would no longer be needed once RAOs are achieved.	**Meets Criteria**. **Residual Risks**: If not properly implemented, could create more toxic byproducts than original contaminants, depending on which approaches are utilized. Properly implemented, no toxic byproducts should be generated. Significant reductions in source area concentrations expected within 1 year. May require reapplication to achieve goals. **Adequacy and Reliability of Controls**: ICs are similar for all alternatives except Alternative 1 and if enforced, adequate. Controls would no longer be needed once RAOs are achieved.	**Meets Criteria.** **Residual Risks**: Properly implemented, no toxic byproducts should be generated. Significant reductions in groundwater concentrations leaving the source area(s) expected within 1 year. **Adequacy and Reliability of Controls**: ICs are similar for all alternatives except Alternative 1 and if enforced, adequate. Controls would no longer be needed once RAOs are achieved.	**Partially Meets Criteria**. **Residual Risks**: Properly implemented, no toxic byproducts should be generated. Significant reductions in groundwater concentrations leaving the source area(s) expected within 3 years. **Adequacy and Reliability of Controls**: ICs are similar for all alternatives except Alternative 1 and if enforced, adequate. Controls would no longer be needed once RAOs are achieved.

Table 10
Comparative Analysis - Remedial Alternatives
Milford Contaminated Aquifer Site
Milford, Clermont County, Ohio

Evaluation Criteria	Alternative 1 - No Action	Alternative 2a - In Situ Treatment - ISCR (Exposure Pathway Elimination, ICs, In Situ treatment with ISCR to treat source area(s))	Alternative 2b - In Situ Treatment - ISCO (Exposure pathway elimination, ICs, In Situ treatment with ISCO to treat source area(s))	Alternative 2c - In Situ Treatment - Combined Remedies (Exposure pathway elimination, ICs, In Situ treatment with combined remedy approach to treat source area(s))	Alternative 3 - In Situ Thermal Treatment (Exposure Pathway Elimination, ICs, In Situ Thermal Treatment of source area, monitoring)	Alternative 4 - Ex Situ Treatment - Pump and Treat (Exposure Pathway Elimination, ICs, Groundwater Pump and Treat System installed near source area, monitoring)
Reduction of toxicity, mobility, or volume through treatment	**Does Not Meet Criteria.** Does not reduce toxicity, mobility, or volume. No treatment applied.	**Achieved**. **Treatment Process:** In situ treatment processes are used to directly treat the contamination. **Amount of contaminants destroyed**: Sufficient contaminants would be destroyed to achieve goals. **Degree of reduction in toxicity, mobility, or volume and specification:** Treatment has potential to leave more toxic byproducts, but proper design and implementation can prevent toxic byproducts. Treats contaminants, but competing demands for treatment reagents are anticipated and will have to be accounted for in design. Volume treated will be evaluated during the design phase. **Degree of Irreversibility:** The treatment is irreversable. **Type and quantity of residual:** Successful treatment will leave only non-toxic residual. No **principal threat** wastes have been identified at the MCA site.	**Achieved**. **Treatment Process:** In situ treatment processes are used to directly treat the contamination. **Amount of contaminants destroyed**: Sufficient contaminants would be destroyed to achieve goals. **Degree of reduction in toxicity, mobility, or volume and specification:** Treatment uses highly reactive reagents, but leaves non-toxic byproducts. Treats contaminants, but competing demands for treatment reagents are anticipated and will have to be accounted for in design. Volume treated will be evaluated during the design phase. **Degree of Irreversibility:** The treatment is irreversable. **Type and quantity of residual:** Successful treatment will leave only non-toxic residuals. No **principal threat** wastes have been identified at the MCA site.	**Achieved**. **Treatment Process:** In situ treatment processes are used to directly treat the contamination. **Amount of contaminants destroyed**: Sufficient contaminants would be destroyed to achieve goals. **Degree of reduction in toxicity, mobility, or volume and specification:** Treatment has potential to leave more toxic byproducts, but proper design and implementation can prevent toxic byproducts. Treats contaminants, but competing demands for treatment reagents are anticipated and will have to be accounted for in design. Volume treated will be evaluated during the design phase. **Degree of Irreversibility:** The treatment is irreversable. **Type and quantity of residual:** Successful treatment will leave only non-toxic residuals. No **principal threat** wastes have been identified at the MCA site.	**Achieved**. **Treatment Process:** In situ treatment processes are used to directly treat the contamination. **Amount of contaminants destroyed**: Sufficient contaminants would be destroyed to achieve goals. **Degree of reduction in toxicity, mobility, or volume and specification:** Treats contaminants, but many non-contaminants will also be removed in the process. Volume treated will be evaluated during the design phase. **Degree of Irreversibility:** The treatment is irreversable. **Type and quantity of residual:** Successful treatment will leave only non-toxic residuals. No **principal threat** wastes have been identified at the MCA site.	**Achieved**. **Treatment Process:** Ex situ treatment processes are used to transfer contaminants from one media (water) to another media (air and or an sorbent such as carbon) prior to either release (for air, through ARAR-compliant treatment devices if necessary) or the destruction of the contaminants through regeneration (for carbon or similar sorbent media). **Amount of contaminants destroyed**: Sufficient contaminants would be destroyed to achieve goals. **Degree of reduction in toxicity, mobility, or volume and specification:** Treats contaminants, but some non-contaminants will also be removed in the process. Volume treated will be evaluated during the design phase. **Degree of Irreversibility:** The treatment is irreversable. **Type and quantity of residual:** Successful treatment will leave only non-toxic residuals. No **principal threat** wastes have been identified at the MCA site.
Short-term effectiveness	**Meets Criteria**. No additional risks to the community, workers, or environment are created because no actions are taken.	**Meets Criteria.** **Protection of Community:** Any immediate risks due to groundwater use are controlled by enforcement of existing ordinance prohibiting private wells. The community will be protected from ordinary risks from construction by approaches such as fencing, signage, and termporary access restrictions. **Protection of Workers:** Risks to workers are generally similar to those from regular construction projects, and can be mitigated by training, engineering controls, and PPE. **Environmental Impacts**: Environmental Impacts are similar to those of ordinary construction, and are not expected to have a noticeable impact.	**Meets Criteria.** **Protection of Community:** Any immediate risks due to groundwater use are controlled by enforcement of existing ordinance prohibiting private wells. The community will be protected from ordinary risks from construction by approaches such as fencing, signage, and temporary access restrictions. The reagents used are highly reactive, and could create some additional risks to the community and workers if they are spilled or accidentally released; however, safe handling procedures can mitigate these risks. **Protection of Workers**: Risks to workers are generally similar to those from regular construction projects, and can be mitigated by training, engineering controls, and PPE. **Environmental Impacts**: Environmental Impacts are similar to those of ordinary construction, and are not expected to have a noticeable impact.	**Meets Criteria.** **Protection of Community:** Any immediate risks due to groundwater use are controlled by enforcement of existing ordinance prohibiting private wells. The community will be protected from ordinary risks from construction by approaches such as fencing, signage, and temporary access restrictions. **Protection of Workers**: Risks to workers are generally similar to those from regular construction projects, and can be mitigated by training, engineering controls, and PPE. **Environmental Impacts**: Environmental Impacts are similar to those of ordinary construction, and are not expected to have a noticeable impact.	**Meets Criteria.** **Protection of Community:** Any immediate risks due to groundwater use are controlled by enforcement of existing ordinance prohibiting private wells. The community will be protected from ordinary risks from construction by approaches such as fencing, signage, and temporary access restrictions. **Protection of Workers**: Risks to workers are generally similar to those from regular construction projects, and can be mitigated by training, engineering controls, and PPE. **Environmental Impacts**: Environmental Impacts are similar to those of ordinary construction, and are not expected to have a noticeable impact.	**Meets Criteria.** **Protection of Community:** Any immediate risks due to groundwater use are controlled by enforcement of existing ordinance prohibiting private wells. The community will be protected from ordinary risks from construction by approaches such as fencing, signage, and temporary access restrictions. The pump and treat system would likely have to remain in place for an extended period of time (several decades), which increases the chance of inadvertent contact (most components will either be underground or in a locked building). **Protection of Workers**: Risks to workers are generally similar to those from regular construction projects, and can be mitigated by training, engineering controls, and PPE. **Environmental Impacts**: Environmental Impacts are similar to those of ordinary construction, and are not expected to have a noticeable impact.

Table 10
Comparative Analysis - Remedial Alternatives
Milford Contaminated Aquifer Site
Milford, Clermont County, Ohio

Evaluation Criteria	Alternative 1 - No Action	Alternative 2a - In Situ Treatment - ISCR (Exposure Pathway Elimination, ICs, In Situ treatment with ISCR to treat source area(s))	Alternative 2b - In Situ Treatment - ISCO (Exposure pathway elimination, ICs, In Situ treatment with ISCO to treat source area(s))	Alternative 2c - In Situ Treatment - Combined Remedies (Exposure pathway elimination, ICs, In Situ treatment with combined remedy approach to treat source area(s))	Alternative 3 - In Situ Thermal Treatment (Exposure Pathway Elimination, ICs, In Situ Thermal Treatment of source area, monitoring)	Alternative 4 - Ex Situ Treatment - Pump and Treat (Exposure Pathway Elimination, ICs, Groundwater Pump and Treat System installed near source area, monitoring)
Implementability	**Does Not Meet Criteria**. **Technical Feasibility:** Very easy to implement, there is nothing to be done. **Adminstrative Feasibility**: Not feasible, this alternative is highly unlikely to receive approval from the regulators. **Availability of Required Resources:** No resources are required to implement this alternative.	**Meets Criteria.** **Technical Feasibility:** This alternative is feasible. Technical challenges such as inadequate characterization of the source area(s) and those related to geochemistry, such as competing reactions for treatment reagents can be mitigated in the design process. **Administrative Feasibility:** This alternative is feasible. This alternative uses an approach which has been successfully been used at other sites, regulators are familiar with the technology. **Availability of Required Resources:** The resources required to implement this remedy are readily available. Where proprietary products are available, there are generally similar products available from other vendors.	**Meets Criteria.** **Technical Feasibility:** This alternative is feasible. Technical challenges such as inadequate characterization of the source area(s) and those related to geochemistry, such as competing reactions for treatment reagents can be mitigated in the design process. **Administrative Feasibility:** This alternative is feasible. This alternative uses an approach which has been successfully been used at other sites, regulators are familiar with the technology. **Availability of Required Resources:** The resources required to implement this remedy are readily available. Where proprietary products are available, there are generally similar products available from other vendors.	**Meets Criteria.** **Technical Feasibility:** This alternative is feasible. Technical challenges such as inadequate characterization of the source area(s) and those related to geochemistry, such as competing reactions for treatment reagents can be mitigated in the design process. **Administrative Feasibility:** This alternative is feasible. This alternative uses an approach which has been successfully been used at other sites, regulators are familiar with the technology. **Availability of Required Resources:** The resources required to implement this remedy are readily available. Where proprietary products are available, there are generally similar products available from other vendors.	**Partially Meets Criteria.** **Technical Feasibility:** This alternative is feasible. Technical challenges such as inadequate characterization of the source area(s) and those related to geochemistry, such as competing reactions for treatment reagents can be mitigated in the design process. **Administrative Feasibility:** This alternative is feasible. This alternative uses an approach which has been successfully been used at other sites, regulators are familiar with the technology. **Availability of Required Resources:** The resources required to implement this remedy are avaialble from several vendors, however, tend to be proprietary and not interchangeable between vendors.	**Meets Criteria.** **Technical Feasibility:** This alternative is feasible. Technical challenges such as inadequate characterization of the source area(s) and those related to geochemistry, such as competing reactions for treatment reagents can be mitigated in the design process. **Administrative Feasibility:** This alternative is feasible. This alternative uses an approach which has been successfully been used at other sites, regulators are familiar with the technology. **Availability of Required Resources:** The resources required to implement this remedy are readily available. Where proprietary products are available, there are generally similar products available from other vendors.
Total Present Value Cost *(Capital Cost + Present value O&M Cost)*	**$0**	**$ 3.6 Million Total** (30 year present value) *($3.0 Million Capital + $0.6 Million O&M)*	**$ 2.1 Million Total** (30 year present value) *($1.5 Million Capital + $0.6 Million O&M)*	**$ 3.3 Million Total** (30 year present value) *($2.7 Million Capital + $0.6 Million O&M)*	**$13.6 Million Total** (30 year present value) *($13 Million Capital + $0.6 Million O&M)*	**$14.9 Million Total** (30 year present value) *(8.1 Million Capital + $6.8 Million O&M)*

Notes:

A more detailed discussion of the alternatives and their comparison to the Criteria is provided in Section 7 of the FS for individual alternatives and Section 8 of the FS for a comparison between alternatives. A more detailed comparison of the alternatives to one another is provided in Section 8 of the FS.

[1] The threshold criteria are evaluated on a pass (Meets Criteria) or fail (Does Not Meet Criteria) basis. An alternative must pass both threshold criteria to be considered as a remedial action.

[2] The two modifying criteria, state acceptance and community acceptance, will be evaluated after comment on the FS report and the proposed plan, and will be addressed in the Record of Decision.

ARAR - Applicable or Relevant and Appropriate Requirement
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
FS - Feasibility study
IC - Institutional Controls
O&M - Operation and maintenance

Authority / Category	Citation	Criteria/Issues	ARAR Type and Status	Analysis	Able to Comply
Clean Water Act	33 U.S.C. § 1314(a)	National recommended water quality criteria	Action Specific Potentially Applicable	For all actions that generate wastewater effluent, containing PCE and/or TCE, that is discharged to the publicly-owned treatment works. National recommended criteria to protect human health are more stringent than those adopted by Ohio.	*Alternative 1 has no actions, and therefore does not trigger this ARAR.* *Alternatives 2a, 2b, 2c, and 3 are not expected to include water discharge, and therefore would not trigger this requirement.* *Alternative 4, depending on the final design, may discharge to a POTW or have its own discharge, and would comply with this requirement.*
Clean Water Act	40 C.F.R. Part 403, O.A.C. § 3745-3	General pretreatment regulations for existing and new sources of pollution, pretreatment rules	Action Specific Potentially Applicable	For all actions where wastewater or wastewater effluent is discharged to the publicly-owned treatment works.	*Alternative 1 has no actions, and therefore does not trigger this ARAR.* *Alternatives 2a, 2b, 2c, and 3 are not expected to include discharges to a POTW and would therefore not trigger this requirement.* *Alternative 4, depending on final design, may include discharge to a POTW (in which case it would comply), or may have its own discharge (in which case it would not trigger the requirement).*
Clean Water Act	33 U.S.C. § 1342 40 C.F.R. Part 122 33 U.S.C. § 1344	Regulates discharges of pollutants to navigable waters (establishes the National Pollutant Discharge Elimination System)	Action Specific. Potentially Applicable	Applicability will depend on the nature of the remedy selected.	*Alternative 1 has no actions, and therefore does not trigger this requirement.* *Alternatives 2a, 2b, 2c, and 3 are not anticipated to trigger this requirement. Alternative 4 may trigger this requirement depending on final design. Only Alternative 4 has both the potential to disturb more than 1 acre of land and the potential for a point source discharge (if not discharging to a POTW) and therefore potentially trigger this requirement and would comply with this requirement.*

Federal Safe Drinking Water Act	40 C.F.R. §§ 141.61, 141.64; O.A.C. §§ 3745-81-11, 3745-81-12	National primary drinking water standards – maximum contaminant levels (MCLs) for organic contaminants and disinfection byproducts; MCLs for inorganic contaminants	Chemical Specific Relevant and Appropriate (for site-related chemicals); To Be Considered (for non-site-related chemicals)	For all groundwater actions, the aquifer is a source of drinking water for Milford. Limited to contaminants of concern (COCs) and daughter products (chloroform, dibromochloromethane, trichloroethene, tetrachloroethene, and *cis*-1,2-dichloroethene).	*These requirements cannot be applicable as they only apply to finished drinking water from a public water system. However, it can be relevant and appropriate. Alternative 1 takes no actions and does not comply with this requirement, as no actions would be taken to address site-related COCs above MCL values. Alternatives 2a, 2b, 2c, 3, and 4 would comply with this requirement for site-related chemicals only*
Federal Safe Drinking Water Act	40 C.F.R. §§ 141.50, 141.53	National primary drinking water standards – maximum contaminant level goals (MCLGs) for organic contaminants and disinfection byproducts	Chemical Specific To Be Considered	For all groundwater actions, the aquifer is a source of drinking water for Milford. Limited to contaminants of concern (COCs) and daughter products with non-zero MCLGs (chloroform, dibromochloromethane, and *cis*-1,2-dichloroethene).	*Because the MCLGs are goals, and not enforceable, they cannot be applicable. As with MCLs, they apply to finished drinking water, and therefore do not apply to the MCA site. However, they can be considered. Alternative 1 has no actions and therefore does not trigger this ARAR. Alternatives 2a, 2b, 2c, 3, and 4 would trigger this ARAR, and would comply*
Federal Safe Drinking Water Act	40 C.F.R. §§ 144.11, 144.12; O.A.C. §§ 3745-34-06, 3745-34-07	Prohibition of unauthorized injection and of movement of fluid into underground sources of drinking water	Action Specific Applicable	Treatment would include injection directly into or in close proximity to groundwater that is a source of drinking water. The injection wells would be Class V wells. The area where the treatment activities would be applied is the source area and the activities are intended to reduce contaminant mass and would not exacerbate the contamination or cause movement into uncontaminated areas of the groundwater.	*Alternative 1 has no actions and therefore does not trigger this ARAR. Alternatives 2a, 2b, 2c, 3, and 4 may trigger this ARAR and would comply*

Resource Conservation and Recovery Act (RCRA)	40 C.F.R. Part 261 40 C.F.R. Part 262 40 C.F.R. Part 273	Provides requirements for the Identification and Listing of hazardous waste; standards applicable to generators of hazardous waste, and standards for Universal Waste Management	Action Specific Potentially Applicable	Any wastes generated would have to be evaluated to see if they meet the requirements of a hazardous waste or universal waste. If the waste has been evaluated to be a hazardous waste, then the standards applicable to generators of waste (Part 262) would apply. If the waste is determined to be a universal waste, then the requirements of Part 273 would apply.	*Alternative 1 takes no actions and therefore would not trigger this requirement.* *Alternatives 2a, 2b, 2c, 3, and 4 would comply with the requirements which are triggered.*
RCRA regulated solid waste disposal unit	40 C.F.R. Part 257, Subpart A	Minimum design and operation criteria for land disposal of solid wastes	Action Specific Not Applicable, Not Relevant or Appropriate	The requirement is not applicable, as there are no regulated units currently on site. None of the alternatives include construction of a solid waste management unit.	*None of the Alternatives are expected to trigger this requirement.*
RCRA Treatment, Storage, or Disposal Facility (TSDF) Requirements	40 C.F.R. § 264.110	Regulated Hazardous Waste Unit	Action Specific Not Applicable Nor Relevant or Appropriate	The MCA site is not a RCRA hazardous waste unit, no hazardous waste has been identified on site. Construction of a hazardous waste unit is not anticipated in any of the alternatives.	*None of the Alternatives are expected to trigger this requirement.*
RCRA Corrective Action Management Unit (CAMU)	40 C.F.R. § 264.552	Requirements for Corrective Action Management Units at RCRA-Permitted treatment, storage, and disposal facilities undergoing corrective action.	Action Specific Not Applicable Not Relevant or Appropriate	The MCA site is not a RCRA TSDF facility, and none of the alternatives include construction of a CAMU. No hazardous waste has been identified at the MCA site.	*None of the Alternatives are expected to trigger this requirement.*
RCRA Land Disposal Restriction	40 C.F.R. Part 268	Provides restrictions on disposal of hazardous waste unless treatment standards are met	Action Specific Potentially Applicable	No hazardous waste has been identified on site, and none of the alternatives include on-site waste disposal. May be applicable if hazardous wastes are generated during implementation of the remedy; however, any such wastes would be shipped to an off-site disposal facility.	*Alternative 1 takes no actions and would not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate hazardous waste, and if hazardous waste is generated, would trigger this requirement, which would be complied with.*

Underground Injection Control	40 C.F.R Parts 144 - 147	Underground Injection Control	Action-Specific Potentially Applicable	Potentially applicable depending on the remedial action chosen. Some alternatives include injecting reagents to treat groundwater; however, injection and recirculation of contaminated groundwater is not considered at this time.	*Alternative 1 takes no actions and would not trigger this requirement. Alternatives 2a, 2b, and 2c all involve the injection of reagents to treat groundwater, which does not trigger this requirement. Neither Alternative 3 nor 4 include recirculation of contaminated groundwater, and so do not trigger this requirement. However, should the final design for Alternatives 3 or 4 include recirculation of groundwater, they would comply with this requirement.*
Clean Air Act	40 C.F.R. Part 63, Subpart GGGGG	Standards for hazard air pollutants from Site Remediation	Action Specific Potentially Applicable	Applies only to active remediation operations at sites that are major sources with affected facilities subject to another MACT standard (probably would not apply to MCA Site)	*Alternative 1 has no actions and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 are not expected to trigger this requirement, as the MCA site itself is not subject to a MACT standard.*
Clean Air Act	40 C.F.R. Part 60	New Source Performance Standards	Action Specific Potentially Applicable	Potentially applies to new sources if they emit or have the potential to emit a large enough amount of pollutants (VOCs being of primary interest).	*Alternative 1 has no actions and therefore does not trigger this requirement. Alternatives 2a, 2b, and 2c are not expected to trigger this requirement. Alternatives 3 and 4 may trigger this requirement, and would comply with this requirement if triggered.*
National Historic Preservation Act	54 U.S.C. § 300101, *et seq.*	Protection of historic places	Applicable	Two nearby sites are listed on the National Register of Historic Places. Promont House (906 Main Street) is approximately 1,000 feet from the former Baker Feed and Seed property. The Gatch Site is approximately ½ mile south of the intersection of Main Street and Lila Avenue. Applicable if the remedial action will affect any historic or cultural resources. If so, a finding of either adverse effect or no adverse effect must be made.	*Alternative 1 has no actions and therefore does not trigger this ARAR.* *Alternatives 2a, 2b, 2c, 3, and 4 would trigger this ARAR, but are not expected to affect either of the National Register of Historic Places Sites located nearby. Therefore, Alternatives 2a, 2b, 2c, 3, and 4 would comply with this requirement.*

Endangered Species Act	16 U.S.C. § 1531, *et seq.*	Protection of threatened and endangered species and habitat	Applicable	Threatened and endangered species have been identified in Clermont County. Aquatic and aquatic-dependent species are present in/around the Little Miami River. Plant and non-aquatic wildlife are unlikely to be present due to lack of habitat.	*Alternative 1 has no actions and therefore does not trigger this ARAR.* *Alternatives 2a, 2b, 2c, 3, and 4 would trigger this ARAR, and would comply.*
Fish and Wildlife Coordination Act Fish and Wildlife Act of 1956 Fish and Wildlife Conservation Act of 1980	16 U.S.C. § 661, *et seq.* 16 U.S.C. § 742a, *et seq.* 16 U.S.C. § 2901, *et seq.* 40 C.F.R. Part 6 50 C.F.R. Part 402	Actions that affect species/habitat require consultation with U.S. Department of Interior, U.S. Fish and Wildlife Service, and National Marine Fisheries Service, and/or state agencies, as appropriate, to ensure that proposed actions do not jeopardize the continued existence of the species or adversely modify or destroy critical habitat. The effects of water-related projects on fish and wildlife resources must be considered. Action must be taken to prevent, mitigate, or compensate for project-related damages or losses to fish and wildlife resources. Consultation with the responsible agency is also strongly recommended for on-site actions.	Location Specific Potentially Applicable	No sensitive habitats have been identified in the area(s) where the remediation is anticipated to be constructed.	*Alternative 1 has no action and therefore does not trigger these requirements.* *Alternatives 2a, 2b, 2c, 3, and 4 are not expected to affect sensitive habitats or cause damages or losses to fish and wildlife resources, and therefore would not trigger this requirement.*

Department of Transportation Requirements for the Transport of Hazardous Materials	49 C.F.R. Part 172	Transportation of hazardous materials on public roadways, or by rail, air, or waterway must comply with the requirements. If hazardous materials are offered for transportation or transported to the Site as part of a remedial action, DOT regulations would apply. Would also apply to hazardous waste transported from the site.	Action Specific Potentially Applicable	Except for Alternative 1, hazardous materials (which include diesel fuel and gasoline, as well as some of the reagents used in various treatment processes) are likely to be required for implementation of the selected remedy.	*Alternative 1, which takes no action, does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 are all expected to trigger this requirement and would comply with the requirements.*
Integrated Risk Information System (IRIS)	www.epa.gov/iris	Risk reference doses (RfDs) are estimates of daily exposure levels that are unlikely to cause significant adverse non-carcinogenic health effects over a lifetime. Cancer Slope Factors (CSFs) are used to compute the incremental cancer risk from exposure to site contaminants and represent the most up-to-date information on cancer risk from EPA's Carcinogen Assessment Group.	Chemical Specific To Be Considered	Not a law or promulgated regulation, IRIS cannot be applicable or relevant and appropriate. Important in evaluating risk.	*As a "To Be Considered" Requirement, none of the alternatives need to comply with this requirement. IRIS is a source of risk-related information which is used in the risk assessment process. IRIS is updated from time to time. Information within IRIS can be used both for evaluating potential risks and evaluating the potential effectiveness of remedies.* *Important in evaluating risk.*

EPA Regional Screening Levels	https://www.epa.gov/risk/regional-screening-levels-rsls	EPA Regional Screening Levels [RSLs] and associated guidance necessary to calculate them) are risk-based tools for evaluating and cleaning up contaminated sites. The RSLs represent Agency guidelines and are not legally enforceable standards.	Chemical Specific To Be Considered	EPA RSLs are screening levels and can be used to assess if concentrations are potentially protective or not. The RSLs are typically updated twice per year. Important in evaluating risk.	*As a "To Be Considered" Requirement, none of the alternatives need to comply with this requirement. RSLs are a source of risk-related information which is used in the risk assessment process.* *Important in evaluating risk.*
Occupational Safety and Health Act	29 C.F.R. Part 1910 and 29 C.F.R. Part 1926		Action Specific Potentially Applicable	Requirements are related to worker safety for both the construction industry and hazardous waste operations and emergency response are important for worker safety.	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 all would trigger this requirement (related to construction requirements and hazardous waste operations and emergency response (HAZWOPER) sections, as well as potentially other sections, depending on the final design and specific processes used to construct the remedy and would comply with the requirements.*
Discharge to Surface Water (DSW)	Ohio Administrative Code (O.A.C.) Chapter 3745-33	Ohio Individual NPDES Permits	Action Specific Potentially Applicable	Requirements are triggered by point source discharge and some non-point source discharges.	*Alternative 1 takes no action and would not trigger this requirement. Alternatives 2a, 2b, 2c and 3 are not anticipated to trigger this requirement. Alternative 4 may trigger this requirement, and would include measures in the design, such as discharge concentrations, would comply with this requirement.*
DSW	O.A.C. Chapter 3745-42	Permits to Install and Plan Approvals for Water Pollution Control	Action Specific Potentially Applicable	Requirements are triggered by point source discharge and some non-point source discharges.	*Alternative 1 takes no action and would not trigger this requirement. Alternatives 2a, 2b, 2c and 3 are not anticipated to trigger this requirement. Alternative 4 may trigger this requirement, and would comply with the requirement.*

Hazardous Waste (HW) Air Pollution Control (APC)	Ohio Revised Code (O.R.C.) § 3734.02 (I)	Air emissions from hazardous waste facilities No hazardous waste facility shall emit any particulate matter, dust, fumes, gas, mist, smoke, vapor, or odorous substance that interferes with the comfortable enjoyment of life or property or is injurious to public health	Action Specific Potentially Applicable; Potentially relevant and appropriate	Pertains to any site at which hazardous waste will be managed such that air emissions may occur. Consider for sites that will undergo movement of earth or incineration. Appears to be triggered by the generation or management of hazardous waste, which may not occur under most alternatives. Therefore, it may be relevant and appropriate.	*Alternative 1 has no actions and therefore does not trigger this ARAR. Only limited movement of earth (primarily related to drilling) is anticipated for the other alternatives.* *Alternatives 3 and 4 are most likely to generate air emissions, which can be controlled and would comply with this requirement.*
APC DSW	O.R.C. § 3767.13	Prohibition of Nuisances Prohibits noxious exhalations or smells and the obstruction of waterways.	Action Specific Potentially Applicable	Pertains to any site that may have noxious smells or may obstruct waterways.	*Alternative 1 has no actions and therefore does not trigger this ARAR,* *Alternatives 2a, 2b, 2c, 3, and 4 would all comply with this ARAR to the extent that they may trigger the ARAR*
DSW	O.R.C. § 3767.14	Prohibition of Nuisances Prohibition against throwing refuse, oil, or filth into lakes, streams, or drains.	Action Specific Potentially Applicable	Pertains to all sites located adjacent to lakes, streams, or drains.	*Alternative 1 has no actions and therefore does not trigger this ARAR.* *Alternatives 2a, 2b, 2c, 3, and 4 would all comply with this ARAR to the extent that they may trigger the ARAR*
Division of Environmental Response and Revitalization (DERR)	O.R.C. § 5301.80 – 5301.92	Uniform Environmental Covenants Act Standards for environmental covenants	Action Specific Potentially Applicable	Consider for sites with institutional controls or use restrictions. Depends on the type of institutional control(s) selected. May not be needed for some types (such as county or city ordinances)	*Alternative 1 has no action and therefore does not trigger this ARAR.* *All other alternatives would comply if an environmental covenant is determined to be required as part of the institutional controls for the site.*
DSW	O.R.C. § 6111.04	Acts of Pollution Prohibited Pollution of waters of the state is prohibited.	Action Specific Potentially Applicable	Pertains to any site which has contaminated on-site ground or surface water or will have a discharge to on-site surface or ground water.	*Alternative 1 has no actions and therefore does not trigger this ARAR,* *Alternatives 2a, 2b, 2c, and 3 are not expected to trigger this ARAR.* *Alternative 4 would comply with this ARAR to the extent that it may trigger the ARAR*

DSW	O.R.C. § 6111.07, paragraphs A and C	Water Pollution Control Requirements - Duty to Comply Prohibits failure to comply with requirements of sections 6111.01 to 6111.08 or any rules, permit or order issued under those sections.	Action Specific Potentially Applicable, depending on remedy selected to the extent that actions are off-site. Relevant and Appropriate (Permits not required for CERCLA actions conducted entirely on site)	Pertains to any site which has contaminated ground water or surface water or will have a discharge to on-site surface or ground water.	*Alternative 1 has no actions and therefore does not trigger this ARAR.* *Alternatives 2a, 2b, 2c, 3, and 4 would comply with the requirement if the final design triggers the requirement.*
HW	O.A.C. § 3745-54-15, paragraphs A and C	Inspection Requirements for Hazardous Waste Facilities Hazardous waste facilities must be inspected regularly to detect malfunctions, deteriorations, operational errors, and discharges. Any malfunctions or deteriorations detected shall be remedied expeditiously.	Action Specific Does not appear to be triggered. *Per O.A.C. 3745-54-01 (g)(3) and 3745-54-01 (J), this requirement does not apply to either a generator accumulating or conducting treatment of hazardous waste that is generated on-site in compliance with rules 3745-52-14 through 17 or to remediation waste management suites*	Pertains to any site at which hazardous waste is to be treated, stored, or disposed of (or has been disposed of).	*ARAR is not expected to be triggered by any of the alternatives.* *3745-54-01 (B) indicates that 3745-54 to 3754-57 and 3745-205 apply to owners and operators of facilities which treat, store, or dispose of hazardous waste. None of the alternatives meet this trigger.*
DSW	O.R.C. § 6111.042	Rules Requiring Compliance with National Effluent Standards Establishes regulations requiring compliance with national effluent standards.	Action Specific Potentially Applicable	Pertains to any site which will have a point source discharge.	*Alternatives 1, 2a, 2b, 2c, and 3 are not anticipated to have a point source, and therefore would not trigger this requirement.* *Alternative 4 may trigger this requirement, depending on the design, and would comply should it trigger the requirement.*
DSW	O.A.C. § 3745-1-03	Analytical and Collection Procedures Specifies analytical methods and collection procedures for surface water discharges.	Action Specific Potentially applicable	Pertains to both discharges to surface waters as a result of remediation and any on-site surface waters affected by site conditions.	*Alternatives 1, 2a, 2b, 2c, and 3 are not anticipated to have discharges to water of the state and therefore would not trigger this requirement.* *Alternative 4 may trigger this requirement, depending on the design, and would comply should it trigger the requirement.*

DSW	O.A.C. § 3745-1-04, Paragraphs A, B, C, D, and E	The "Five Freedoms" for Surface Water All surface waters of the state shall be free from: A) objectionable suspended solids. B) floating debris, oil, and scum. C) materials that create a nuisance. D) toxic, harmful, or lethal substances. E) nutrients that create nuisance growth	Action Specific Potentially applicable	Pertains to both discharges to surface waters as a result of remediation and any on-site surface waters affected by site conditions.	*Alternatives 1, 2a, 2b, 2c, and 3 are not anticipated to have discharges to water of the state and therefore would not trigger this requirement.* *Alternative 4 may trigger this requirement, depending on the design, and would comply should it trigger the requirement.*
DSW	O.A.C. § 3745-1-07	Water Quality Criteria Establishes water quality criteria for pollutants which do not have specific numerical or narrative criteria identified in tables 7-1 through 7-15 of this rule.	Action Specific Potentially applicable	Pertains to both discharges to surface waters as a result of remedial action and any surface waters affected by site conditions.	*Alternatives 1, 2a, 2b, 2c, and 3 are not anticipated to have discharges to water of the state and therefore would not trigger this requirement.* *Alternative 4 may trigger this requirement, depending on the design, and would comply should it trigger the requirement.*
DSW	O.A.C. § 3745-1-18	Water Use Designations for Little Miami River Establishes water use designations for stream segments within the Little Miami River Basin.	Action Specific, Location Specific Potentially applicable	Pertinent if stream or stream segment is on-site and is either affected by site conditions of if remedy includes direct discharge. Used by DSW to establish waste load allocations	*Alternatives 1, 2a, 2b, 2c, and 3 are not anticipated to have discharges to water of the state and therefore would not trigger this requirement.* *Alternative 4 may trigger this requirement, depending on the design, and would comply should it trigger the requirement.*
DSW	O.A.C. § 3745-1-32	Water Quality Criteria for Ohio River Drainage Basin Establishes criteria for surface water in Ohio river drainage basin.	Action Specific, Location Specific Potentially Applicable	Pertinent if stream or stream segment is on-site and is either affected by site conditions or if remedy includes direct discharge. Used by DSW to establish waste load allocations	*Alternatives 1, 2a, 2b, 2c, and 3 are not anticipated to have discharges to water of the state and therefore would not trigger this requirement.* *Alternative 4 may trigger this requirement, depending on the design, and would comply should it trigger the requirement.*

APC	O.A.C. § 3745-15-05, Paragraphs A-D	De Minimis Air Contaminant Source Exemption Establishes limits below which air discharge permits are not needed	Action Specific Potentially Applicable	Pertains to any site which utilizes or will utilize air pollution control equipment on-site.	*Alternative 1 has no actions and therefore does not trigger this alternative. Alternatives 2a, 2b, and 2c do not contain air emissions sources and therefore do not trigger this requirement. Alternatives 3 and 4, depending on final design, may trigger this requirement and either would comply (by meeting the exemption requirements) or have emissions exceeding exemption requirements in which case this requirement is not triggered.*
APC	O.A.C. § 3745-15-06, paragraphs A1, A2	Malfunction & Maintenance of Air Pollution Control Equipment Establishes scheduled maintenance and specifies when pollution source must be shut down during maintenance	Action specific Potentially Applicable	Pertains to any site which utilizes or will utilize air pollution control equipment on-site.	*Alternative 1 has no actions and therefore does not trigger this requirement. Alternatives 2a, 2b, and 2c do not contain air emissions sources and therefore do not trigger this requirement. Alternatives 3 and 4, depending on final design, may trigger this requirement and would comply with this requirement.*
APC	O.A.C. § 3745-15-07, paragraph A	Air Pollution Nuisances Prohibited Defines air pollution nuisance as the emission or escape into the air from any source(s) of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors and combinations of the above that endanger health, safety or welfare of the public or cause personal injury or property damage. Such nuisances are prohibited.	Action Specific Potentially Applicable	Pertains to any site which causes, or may reasonably cause, air pollution nuisances. Consider for sites that will undergo excavation, demolition, cap installation, methane production, clearing and grubbing, water treatment, incineration, and waste fuel recovery.	*Alternative 1 has no actions and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 would comply with this requirement.*

APC	O.A.C. § 3745-21-09	VOC Emissions Control: Stationary Sources Establishes limitations for emissions of volatile organic compounds from stationary sources.	Action Specific Potentially Applicable	Pertains to any site with treatment systems that emit volatile organic compounds, including those with thermal desorption and air stripping.	*Alternative 1 has no actions and therefore does not trigger this requirement. Alternatives 2a, 2b, and 2c do not have stationary sources, and therefore do not trigger this requirement. If Alternatives 3 and 4 are determined to trigger this requirement, they would comply with this requirement.*
DSW	O.A.C. § 3745-3-04, Paragraphs A-D	Prohibited Discharges Places restrictions on discharges to POTWs that may harm treatment functions or pass through to receiving stream.	Action Specific Potentially Applicable	Consider for sites with discharges to POTW.	*Alternative 1 has no actions and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c and 3 are not expected to have discharges to a POTW, and therefore would not trigger this requirement. Alternative 4, depending on final design, may trigger this requirement and would comply.*
DSW	O.A.C. § 3745-3-05, Paragraphs A-C	Notification of Potential Problems Including Slug Load Requires industrial users to notify POTW of discharges that may adversely affect treatment operations, including slug loads	Action Specific Potentially Applicable	Consider for sites with discharges to POTW.	*Alternative 1 has no actions and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c and 3 are not expected to have discharges to a POTW, and therefore would not trigger this requirement. Alternative 4, depending on final design, may trigger this requirement and would comply.*
APC	O.A.C. § 3745-31-02, Paragraphs A, C, D	Permit to Install, General Requirements General requirements for permit to install air pollution sources	Action Specific Potentially Applicable	Consider for sites with potential for air emissions, including sites with soil vapor extraction, thermal desorption, incineration, or other treatment technologies with air emissions	*Alternative 1 has no action and therefore does not trigger this requirement. Alternatives 2a, 2b, and 2c do not have air pollution sources, and therefore do not trigger this requirement. Alternatives 3 and 4 may have air pollution sources, and would comply this requirement*

Underground Injection Control (UIC)	O.A.C. § 3745-34-06	Prohibition of Unauthorized Injection Underground injection is prohibited without authorization from the director.	Action Specific Potentially Applicable	Pertains to sites at which materials are to be injected underground. Consider for technologies such as bioremediation and soil flushing.	*Alternative 1 has no action and therefore does not trigger this requirement. Alternatives 2a, 2b, and 2c all include underground injection, and would comply with substantive portions of this requirement. Alternatives 3 and 4 are not anticipated to include underground injections, and therefore would not trigger this requirement.*
UIC	O.A.C. § 3745-34-07	No Movement of Fluid into Underground Drinking Water The underground injection of fluid containing any contaminant into an underground source of drinking water is prohibited if the presence of that contaminant may cause a violation of the primary drinking water standards or otherwise adversely affect the health of persons.	Action Specific Potentially Applicable	Pertains to sites at which materials are to be injected underground. Consider for technologies such as bioremediation and soil flushing.	*Alternative 1 has no action and therefore does not trigger this requirement. Alternatives 2a, 2b, and 2c all include underground injection, and would comply with this requirement. Alternatives 3 and 4 are not anticipated to include underground injections, and therefore would not trigger this requirement.*
HW	O.A.C. § 3745-52-11, Paragraphs A-D	Evaluation of Wastes Any person generating a waste must determine if that waste is a hazardous waste (either through listing or by characteristic).	Action Specific Potentially Applicable	Pertains to sites at which wastes of any type (both solid and hazardous) are located.	*Alternative 1 has no action and therefore does not trigger this requirement.* *Alternatives 2a, 2b, 2c, 3, and 4 all may generate wastes, which would then be evaluated to comply with this requirement.*
HW	O.A.C. § 3745-52-12, Paragraphs A-C	Generator Identification Number A generator must not store, treat dispose, or transport hazardous wastes without a generator number	Action Specific Potentially Applicable	Pertains to sites where hazardous waste will be transported off-site for treatment, storage or disposal	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate wastes, which if identified as hazardous would trigger and comply with this requirement.*

HW	O.A.C. § 3745-52-20	Hazardous Waste Manifest - General Requirements Requires a generator who transports or offers for transportation hazardous waste for off-site treatment, storage, or disposal to prepare a uniform hazardous waste manifest	Action Specific Potentially Applicable	Pertains to sites where hazardous waste will be transported off-site for treatment, storage, or disposal	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate wastes, which if identified as hazardous would trigger this requirement and a uniform hazardous waste manifest would be prepared to comply with this requirement.*
HW	O.A.C. § 3745-52-22	Hazardous Waste Manifest - Number of Copies Specifies the number of manifest copies to be prepared	Action Specific Potentially Applicable	Pertains to sites where hazardous waste will be transported off-site for treatment, storage or disposal	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate wastes, which if identified as hazardous would trigger this requirement and uniform hazardous waste manifests would be prepared to comply with this requirement..*
HW	O.A.C. § 3745-52-23	Hazardous Waste Manifest – Use Specifies procedures for the use of hazardous waste manifests including a requirement that they be hand signed by the generator	Action Specific Potentially Applicable	Pertains to sites where hazardous waste will be transported off-site for treatment, storage, or disposal	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate wastes, which if identified as hazardous would trigger this requirement and a uniform hazardous waste manifest would be prepared to comply with this requirement.*
HW	O.A.C. § 3745-52-30	Hazardous Waste Packaging Requires a generator to package hazardous waste in accordance with U.S. DOT regulations for transportation off-site.	Action Specific Potentially Applicable	Pertains to any site where hazardous waste will be generated by on-site activities and shipped off-site for treatment and/or disposal.	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate wastes, which if identified as hazardous would trigger and packaging and shipping would comply with this requirement.*
HW	O.A.C. § 3745-52-31	Hazardous Waste Labeling Requires packages of hazardous waste to be labeled in accordance with U.S. DOT regulations for off- site transportation.	Action Specific Potentially Applicable	Pertains to any site where hazardous waste will be generated by on-site activities and shipped off-site for treatment and/or disposal.	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate wastes, which if identified as hazardous would trigger and packaging and shipping would comply with this requirement.*

HW	O.A.C. § 3745-52-32	Hazardous Waste Marking Specifies language for marking packages of hazardous waste prior to off-site transportation	Action Specific Potentially Applicable	Pertains to any site where hazardous waste will be generated by on-site activities and shipped off-site for treatment and/or disposal.	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate wastes, which if identified as hazardous would trigger and packaging and shipping would comply with this requirement.*
HW	O.A.C. § 3745-52-33	Hazardous Waste Placarding Generator shall placard hazardous waste prior to off-site transportation.	Action Specific Potentially Applicable	Pertains to any site where hazardous waste will be generated by on-site activities and shipped off-site for treatment and/or disposal.	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate wastes, which if identified as hazardous would trigger and shipping would comply with this requirement.*
HW	O.A.C. § 3745-52-34	Accumulation Time of Hazardous Waste Identifies maximum time periods that a generator may accumulate a hazardous waste without being considered an operator of a storage facility. Also establishes standards for management of hazardous wastes by generators.	Action Specific Potentially Applicable	Pertains to a site where hazardous waste will be generated as a result of the remedial activities	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate wastes, which if identified as hazardous would trigger and shipping would comply with this requirement.*
HW	O.A.C. § 3745-52-40, Paragraphs A-D	Recordkeeping Requirements, Three-Year Retention Specifies records that shall be kept for three years	Action Specific Potentially Applicable	Consider for sites at which hazardous wastes are generated	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate wastes, which if identified as hazardous would trigger and records would comply with this requirement.*
HW	O.A.C. § 3745-52-41, Paragraphs A, B	Annual Report Requires generators to prepare annual report to OEPA	Action Specific Potentially Applicable	Applicable at sites generating wastes for off-site shipment	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 may generate wastes, which if identified as hazardous would trigger and reporting would comply with this requirement.*

HW	O.A.C. § 3745-54-13, Paragraph A	General Analysis of Hazardous Waste Prior to any treatment, storage or disposal of hazardous wastes, a representative sample of the waste must be chemically and physically analyzed.	Action Specific Does not appear to be triggered. *Per O.A.C. 3745-54-01 (g)(3) and 3745-54-01 (J), this requirement does not apply to either a generator accumulating or conducting treatment of hazardous waste that is generated on-site in compliance with rules 3745-52-14 through 17 or to remediation waste management suites*	Pertains to any site at which hazardous is to be treated, stored, or disposed of (or has been disposed of).	*This requirement is not expected to be triggered by any of the Alternatives.* *3745-54-01 (B) indicates that 3745-54 to 3754-57 and 3745-205 apply to owners and operators of facilities which treat, store, or dispose of hazardous waste. None of the Alternatives meet this trigger. The Alternatives may generate hazardous waste.*
HW	O.A.C. § 3745-54-14, Paragraphs A, B, C	Security for Hazardous Waste Facilities Hazardous waste facilities must be secured so that unauthorized and unknowing entry are minimized or prohibited.	Action Specific Does not appear to be triggered. *Per O.A.C. 3745-54-01 (g)(3) and 3745-54-01 (J), this requirement does not apply to either a generator accumulating or conducting treatment of hazardous waste that is generated on-site in compliance with rules 3745-52-14 through 17 or to remediation waste management suites*	Pertains to any site at which hazardous is to be treated, stored, or disposed of (or has been disposed of).	*This requirement is not expected to be triggered by any of the Alternatives.* *3745-54-01 (B) indicates that 3745-54 to 3754-57 and 3745-205 apply to owners and operators of facilities which treat, store, or dispose of hazardous waste. None of the Alternatives meet this trigger. The Alternatives may generate hazardous waste.*
HW	O.A.C. § 3745-54-16	Personnel Training Establishes requirements for training of personnel at hazardous waste facilities	Action Specific Does not appear to be triggered. *Per O.A.C. 3745-54-01 (g)(3) and 3745-54-01 (J), this requirement does not apply to either a generator accumulating or conducting treatment of hazardous waste that is generated on-site in compliance with rules 3745-52-14 through 17 or to remediation waste management suites*	Pertains to any site at which hazardous is to be treated, stored, or disposed of (or has been Disposed of).	*This requirement is not expected to be triggered by any of the Alternatives.* *3745-54-01 (B) indicates that 3745-54 to 3754-57 and 3745-205 apply to owners and operators of facilities which treat, store, or dispose of hazardous waste. None of the Alternatives meet this trigger. The Alternatives may generate hazardous waste.*

HW	O.A.C. § 3745-54-31	Design & Operation of Hazardous Waste Facilities Hazardous waste facilities must be designed, constructed, maintained and operated to minimize the possibility of fire, explosion or unplanned release of hazardous waste or hazardous constituents to the air, soil or surface water which could threaten human health or the environment.	Action Specific Does not appear to be triggered. *Per O.A.C. 3745-54-01 (g)(3) and 3745-54-01 (J), this requirement does not apply to either a generator accumulating or conducting treatment of hazardous waste that is generated on-site in compliance with rules 3745-52-14 through 17 or to remediation waste management suites*	Pertains to any site at which hazardous is to be treated, stored, or disposed of (or has been disposed of).	*This requirement is not expected to be triggered by any of the Alternatives.* *3745-54-01 (B) indicates that 3745-54 to 3754-57 and 3745-205 apply to owners and operators of facilities which treat, store, or dispose of hazardous waste. None of the Alternatives meet this trigger. The Alternatives may generate hazardous waste.*
HW	O.A.C.§ 3745-54-37, Paragraphs A, B	Arrangements/ Agreements with Local Authorities Arrangements or agreements with local authorities, such as police, fire department and emergency response teams must be made. If local authorities will not cooperate, documentation of that non-cooperation should be provided.	Action Specific Does not appear to be triggered. *Per O.A.C. 3745-54-01 (g)(3) and 3745-54-01 (J), this requirement does not apply to either a generator accumulating or conducting treatment of hazardous waste that is generated on-site in compliance with rules 3745-52-14 through 17 or to remediation waste management suites*	Pertains to any site at which hazardous waste is to be treated, stored, or disposed of (or has been disposed of).	*This requirement is not expected to be triggered by any of the Alternatives.* *3745-54-01 (B) indicates that 3745-54 to 3754-57 and 3745-205 apply to owners and operators of facilities which treat, store, or dispose of hazardous waste. None of the Alternatives meet this trigger. The Alternatives may generate hazardous waste.*
HW	O.A.C. § 3745-54-52, Paragraphs A-F	Content of Contingency Plan; Hazardous Waste Facilities Hazardous waste facilities must have a contingency plan that addresses any unplanned release of hazardous wastes or hazardous constituents into the air, soil, or surface water. This rule establishes the minimum required information of such a plan.	Action Specific Does not appear to be triggered. *Per O.A.C. 3745-54-01 (g)(3) and 3745-54-01 (J), this requirement does not apply to either a generator accumulating or conducting treatment of hazardous waste that is generated on-site in compliance with rules 3745-52-14 through 17 or to remediation waste management suites*	Pertains to any site at which hazardous waste is to be treated, stored, or disposed of (or has been disposed of).	*This requirement is not expected to be triggered by any of the Alternatives.* *3745-54-01 (B) indicates that 3745-54 to 3754-57 and 3745-205 apply to owners and operators of facilities which treat, store, or dispose of hazardous waste. None of the Alternatives meet this trigger. The Alternatives may generate hazardous waste.*

HW	O.A.C. § 3745-54-53, Paragraphs A, B	Copies of Contingency Plan; Hazardous Waste Facilities Copies of the contingency plan required by 3745-54-50 must be maintained at the facility and submitted to all local police departments, fire departments, hospitals local emergency response teams and the Ohio EPA.	Action Specific Does not appear to be triggered. *Per O.A.C. 3745-54-01 (g)(3) and 3745-54-01 (J), this requirement does not apply to either a generator accumulating or conducting treatment of hazardous waste that is generated on-site in compliance with rules 3745-52-14 through 17 or to remediation waste management suites*	Pertains to any site at which hazardous waste is to be treated, stored, or disposed of (or has been disposed of).	*This requirement is not expected to be triggered by any of the Alternatives.* *3745-54-01 (B) indicates that 3745-54 to 3754-57 and 3745-205 apply to owners and operators of facilities which treat, store, or dispose of hazardous waste. None of the Alternatives meet this trigger. The Alternatives may generate hazardous waste.*
HW	O.A.C. § 3745-54-54, Paragraph A	Amendment of Contingency Plan; Hazardous Waste Facilities The contingency plan must be amended if it fails in an emergency, the facility changes (in its design, construction, maintenance, or operation), the list of emergency coordinators change or the list of emergency equipment changes.	Action Specific Does not appear to be triggered. *Per O.A.C. 3745-54-01 (g)(3) and 3745-54-01 (J), this requirement does not apply to either a generator accumulating or conducting treatment of hazardous waste that is generated on-site in compliance with rules 3745-52-14 through 17 or to remediation waste management suites*	Pertains to any site at which hazardous waste is to be treated, stored, or disposed of (or has been disposed of).	*This requirement is not expected to be triggered by any of the Alternatives.* *3745-54-01 (B) indicates that 3745-54 to 3754-57 and 3745-205 apply to owners and operators of facilities which treat, store, or dispose of hazardous waste. None of the Alternatives meet this trigger. The Alternatives may generate hazardous waste.*
HW	O.A.C. § 3745-54-55	Emergency Coordinator; Hazardous Waste Facilities At all times there should be at least one employee either on the premises or on call to coordinate all emergency response measures.	Action Specific Does not appear to be triggered. *Per O.A.C. 3745-54-01 (g)(3) and 3745-54-01 (J), this requirement does not apply to either a generator accumulating or conducting treatment of hazardous waste that is generated on-site in compliance with rules 3745-52-14 through 17 or to remediation waste management suites*	Pertains to any site at which hazardous waste is to be treated, stored, or disposed of (or has been disposed of).	*This requirement is not expected to be triggered by any of the Alternatives.* *3745-54-01 (B) indicates that 3745-54 to 3754-57 and 3745-205 apply to owners and operators of facilities which treat, store, or dispose of hazardous waste. None of the Alternatives meet this trigger. The Alternatives may generate hazardous waste.*

HW	O.A.C. § 3745-54-56, Paragraphs A-I	Emergency Procedures; Hazardous Waste Facilities Specifies the procedures to be followed in the event of an emergency.	Action Specific Does not appear to be triggered. *Per O.A.C. 3745-54-01 (g)(3) and 3745-54-01 (J), this requirement does not apply to either a generator accumulating or conducting treatment of hazardous waste that is generated on-site in compliance with rules 3745-52-14 through 17 or to remediation waste management suites*	Pertains to any site at which hazardous waste is to be treated, stored, or disposed of (or has been disposed of).	*This requirement is not expected to be triggered by any of the Alternatives.* *3745-54-01 (B) indicates that 3745-54 to 3754-57 and 3745-205 apply to owners and operators of facilities which treat, store, or dispose of hazardous waste. None of the Alternatives meet this trigger. The Alternatives may generate hazardous waste.*
Drinking Water (DW)	O.A.C. § 3745-81-11, Paragraphs A, B, C	Maximum Contaminant Levels for Inorganic Chemicals Presents maximum contaminant levels for inorganics.	Chemical Specific To Be Considered.	Pertains to any site which has contaminated ground or surface water that is either being used, or has the potential for use, as a drinking water source.	*Requirement cannot be applicable because it applies to public water systems, and the MCA site is not a public water system. Potentially relevant and appropriate, however, inorganic chemicals may be present in groundwater due to background conditions and not related to the MCA site. VOCs have been identified as the contaminants at the MCA site, not inorganics, therefore the MCLs for inorganics address non-site related chemicals.*
DW	O.A.C. § 3745-81-12, Paragraphs A, B, C	Maximum Contaminant Levels for Organic Chemicals Presents MCLs for organics.	Chemical Specific Relevant and Appropriate (for site-related chemicals); To Be Considered for non-site-related chemicals	Pertains to any site which has contaminated ground or surface water that is either being used, or has the potential for use, as a drinking water source.	*Requirement cannot be applicable because it applies to public water systems, and the MCA site is not a public water system. Potentially relevant and appropriate for site-related chemicals and their degradation products, including PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, vinyl chloride, bromoform, and chloroform. Alternative 1 takes no action to address this requirement. Alternatives 2a, 2b, 2c, 3, and 4 are all intended to address site-related chemicals with the objective of complying with the MCL values for site-related chemicals.*

Ground Water (GW)	O.A.C. § 3745-9-03, Paragraphs A-C	Monitoring well Standards for design and closure of wells, compliance with DDAGW guidance	Action Specific Potentially Applicable	Pertains to all ground water wells on the site that either will be installed or have been installed since Feb. 15, 1975. Would pertain if new wells are constructed for treatability studies, monitoring network, etc..	*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 would comply with this requirement.*
GW	O.A.C. § 3745-9-10, Paragraphs A, B, C	Abandoned Well Sealing Procedures for closing and sealing wells.	Action Specific Potentially Applicable	Pertains to all ground water wells on the site that either will be installed or have been installed since Feb. 15, 1975.	*Alternative 1 takes no action and therefore does not comply with this requirement. Alternatives 2a, 2b, 2c, 3, and 4 would comply with this requirement.*
Damage to Underground Utilities	O.R.C. §§ 3781.25 to 3781.38	This is the underground utility location law. It requires that a notice via the Ohio one-call system be made seeking utility locations prior to excavation.	Action Specific	Pertains to actions which involve excavation.	*Alternative 1 takes no action, and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, 3, and 4 would comply with this requirement.*
City of Milford	Milford Code of Ordinances, Chapter 921.23 to 921.25	Drilling of Wells authorized; Water Lines Entering Dwelling Construction of Private Wells Decommission of Private Wells Prohibits construction or resumption of use of private wells without obtaining permission (permission shall not be granted where water service is provided), with exceptions for non-potable uses specified. Requires that private wells be decommissioned in an approved manner.	Location Specific Action Specific Potentially Applicable		*Alternative 1 takes no action and therefore does not trigger this requirement.* *Alternatives 2a, 2b, 2c, 3, and 4 all may use these ordinances as an institutional control (subject to final design of the institutional controls to be used) and would comply with this requirement.*
City of Milford	Milford Code of Ordinances Chapter 1303	Ohio Building Code The City of Milford adopts the Ohio Building Code (OBC) and related codes as adopted by the Ohio Board of Building Standards, Department of Industrial Relations.	Location Specific Action Specific Potentially Applicable		*Alternative 1 takes no action and therefore does not trigger this requirement. Alternatives 2a, 2b, 2c, and 3 are anticipated to use mobile and/or transportable equipment, not permanent buildings, and therefore won't trigger this requirement.* *Alternative 4 is anticipated to require a "permanent" building, triggering this requirement, and would comply with this requirement.*

Note: In all cases where it is indicated that an Alternative or Alternatives would comply with requirements, the CERCLA permit exemption would apply to activities conducted entirely on site. Therefore, substantive portions of the requirements (such as discharge or emissions limits, use of specified technology to control emissions, etc.) would be complied with, but the administrative portions (such as applying for and actually obtaining a permit) would not be required.

Table 12 - Cost Estimate Summary
Alternative 2c - In-Situ Treatment with Combined Remedies
Milford Contaminated Aquifer Site
Milford, Clermont County, Ohio

Capital Costs

Risk Mitigation and ICs
Approx 220 properties in greater plume area
Verify properties are on City Water

Item	Quantity	unit rate	units	extended	note	source
Obtain data from Milford	4	$100	hrs	$400	assumed to be electronic (word/excel/GIS)	estimate
Obtain data from Clermont GIS	2	$100	hrs	$200	220 properties	estimate
Cross Reference	4	$100	hrs	$400	220 properties	estimate
Follow Up - identification	5	$100	hrs	$500	20 properties	estimate
Follow up - phone calls	20	$100	hrs	$2,000	20 properties	estimate
Follow up	8	$100	hrs	$800	5 properties - site visit	estimate
Reporting	20	$100	hrs	$2,000		estimate
planning. Project management	20	$150	hrs	$3,000		estimate
SUBTOTAL				**$9,300**		
		With 30% contingency added, rounded			***$12,000***	

Pre-Design Investigation - Baker Feeds area - source location

Item	Quantity	unit rate	unit	extended	Note	Source
Drilling - soil sampling	1	$21,000	each	$ 21,000		estimate
new MW	12	$5,000	each	$ 60,000	includes wells for performance monitoring	estimate
soil samples - VOCs	150	$100	LS	$ 15,000	approx 30 brings, 5 samples/boring	CLP pricing, EPA web site July 2020
analyze water samples - VOCs	75	$105	LS	$ 7,875		CLP pricing, EPA web site July 2020
Field labor for investigation	20	$1,400	person-da	$ 28,000	includes travel expenses, 2 persons	estimate
Alternative-specific analysis	1	$10,000	LS	$ 10,000	May include oxidative / reductive demand, microbial testing, dissolved gasses, etc.	estimate
IDW management	1	$5,000	LS	$ 5,000		estimate
Reporting	1	$25,000	LS	$ 25,000		estimate
Subtotal				$ 171,875		
		With 30% contingency added, rounded			***$223,000***	

Implementation - Initial

Item	Quantity	unit rate	unit	extended	Note	Source
materials and injection	1	800000	LS	$ 800,000		vendor quote
Design contingency @ 35%				$ 280,000		estimate
Construction contingency @ 25%				$ 200,000		estimate
total construcion cost				*$ 1,280,000*		*calculated value*
Design @10%				$ 128,000		estimate
Project and Construciton mangement @ 15%				$ 192,000		estimate
Total Task Cost				**$ 1,600,000**		
	Value to use for capital costs, contingency already included				***$1,600,000***	

Table 12 - Cost Estimate Summary
Alternative 2c - In-Situ Treatment with Combined Remedies
Milford Contaminated Aquifer Site
Milford, Clermont County, Ohio

Implementation - Reinjection in year 3

Item	Quantity	unit rate	unit	extended	Note	Source
materials and injection	0.5	800000	LS	$ 400,000		reinjection equal to half of origninal injection (vendor quote for original injection)
Design contingency @ 35%				$ 140,000		estimiate
Construction contingency @ 25%				$ 100,000		estimiate
total construcion cost				*$ 640,000*		*calculated value*
Design @10%				$ 64,000		estimiate
Project and Construciton mangement @ 15%				$ 96,000		estimiate
Total Task Cost				**$ 800,000**	Cost assumed to occur in year 3	
Value to use for capital costs, contingency already included					***$800,000***	

Enhanced Monitoring Network

Item	Quantity	unit rate	unit	extended	Note	Source
Planning documents	1	$20,000	ea	$ 20,000	Incl FSP, QAPP, HASP, etc	estimate
Network installation	10	$5,000	well	$ 50,000		estimate
Reporting	1	$15,000	LS	$ 15,000		estimate
Subtotal				**$ 85,000**		
With 30% contingency added, rounded					***$111,000***	

Total Capital Costs	**$2,746,000**

Operations and Maintenance Costs

23 wells to be sampled (including 4 PW)
Monitoring Event

Item	Quantity	unit rate	unit	extended	Note	Source
project mangement	8	$150	hrs	$ 1,200		estimate
data validation	30	$50	sample	$ 1,500		estimate
reporting	40	$100	hrs	$ 4,000		estimate
CLP - TVOA	30	$105	sample	$ 3,150		EPA web site July 2020
shipping	5	$100	cooler	$ 500		estimate
labor	100	$85	hrs	$ 8,500		estimate
travel time	20	$85	hrs	$ 1,700		estimate
travel expenses - hotel=per diem	10	$230	person-nig	$ 2,300	2 person team	GSA per diem + estiamte of taxes
travel expenses - rental vehicle	10	$100	day	$ 1,000	separate vehicles	estimate
sample containers (VOA vials)	30	$7	sample	$ 210		vendor pricing + estimate for shipping
sampling incidentals	1	$500	LS	$ 500	ice, ziplocs, field book, plastic sheeting, etc	estimate
Field sampling Equipment	2	$1,400	set	$ 2,800	pump, controller, WL meter, WQ meter, cal soluitons	vendor pricing + estimate for shipping
Annual O&M Costs				$ 27,360		
Annual O&M, with 30% contingency, rounded					***$36,000***	

Table 12 - Cost Estimate Summary
Alternative 2c - In-Situ Treatment with Combined Remedies
Milford Contaminated Aquifer Site
Milford, Clermont County, Ohio

5 -year reviews

Item	Quantity	unit rate	unit	extended	Note	Source
LTRA report - GW	1	$20,000	LS	$ 20,000	LTRA report, includes trend analysis (annual sampling)	
5 Year review	1	$30,000	LS	$ 30,000		
		Every 5 year O&M Costs		$ 50,000		

Values are estimated unless noted otherwise.
Values will be rounded for use in PresentValue analysis and document text and tables.

Table 12 - Cost Estimate Summary
Alternative 2c - In-Situ Treatment with Combined Remedies
Milford Contaminated Aquifer Site
Milford, Clermont County, Ohio

General Notes

All capital costs (design and construction) occur in year 0.
Reinjection is included at 50% cost of initial injection
O&M Costs begin in year 1
Trigger date for 5YR is start of construction, so first 5YR occurs in Year 5
7% Discount Rate

				30 year present value		**$3,301,000**
Year	**Discount Factor**	**Implementation Costs**	(extra column not used)	**O&M Costs**	**5YR Costs**	**Present Value**
0	1	$2,746,000				$2,746,000
1	0.934579			$36,000		$33,645
2	0.873439			$36,000		$31,444
3	0.816298			$36,000		$29,387
4	0.762895			$36,000		$27,464
5	0.712986			$36,000	$50,000	$61,317
6	0.666342			$36,000		$23,988
7	0.62275			$36,000		$22,419
8	0.582009			$36,000		$20,952
9	0.543934			$36,000		$19,582
10	0.508349			$36,000	$50,000	$43,718
11	0.475093			$36,000		$17,103
12	0.444012			$36,000		$15,984
13	0.414964			$36,000		$14,939
14	0.387817			$36,000		$13,961
15	0.362446			$36,000	$50,000	$31,170
16	0.338735			$36,000		$12,194
17	0.316574			$36,000		$11,397
18	0.295864			$36,000		$10,651
19	0.276508			$36,000		$9,954
20	0.258419			$36,000	$50,000	$22,224
21	0.241513			$36,000		$8,694
22	0.225713			$36,000		$8,126
23	0.210947			$36,000		$7,594
24	0.197147			$36,000		$7,097
25	0.184249			$36,000	$50,000	$15,845
26	0.172195			$36,000		$6,199
27	0.16093			$36,000		$5,793
28	0.150402			$36,000		$5,414
29	0.140563			$36,000		$5,060
30	0.131367			$36,000	$50,000	$11,298

ATTACHMENT 3:
ADMINISTRATIVE RECORD INDEX

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION

ADMINISTRATIVE RECORD
FOR THE
MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT COUNTY, OHIO

ORIGINAL
DECEMBER 14, 2021
SEMS ID: 971002

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	375259	11/04/87	Groundwater Management, Inc.	Santoro Engineering Company	Report- Regarding: City of Milford Hydrogeologic Investigation	114
2	375242	12/14/90	U.S. EPA	File	Report-Regarding: EPA Hazard Ranking System, Final Rule, Title 40 CFR Part 300, Federal Register 51532	11
3	375263	10/06/93	Vadose Research, Inc.	Ohio EPA	Report-Regarding: (Excerpt) Preliminary Report: Volume 1, Soil Gas Contaminant Determination and Associated Monitoring Well	62
4	375255	10/01/94	Ohio DNR	File	Report-Regarding: Ground Water Pollution Potential of Clermont County, Ohio	44
5	375250	04/26/99	Ohio EPA	File	Report-Regarding: Reference No. 8A	170
6	375264	04/26/99	Ohio EPA	File	Report-Regarding: Reference No. 138	24
7	375256	06/16/00	Ohio EPA	File	Report-Regarding: Geographic Initiative Report	125
8	375247	09/15/01	Ohio EPA	Ripley, L.,	Report-Regarding: Combined Preliminary Assessment/Site Investigation Report	144
9	375260	08/01/02	WESTON Solutions, Inc.	U.S. EPA	Groundwater Contour Maps	4

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
10	375249	09/19/02	Ohio EPA	U.S. EPA	Report-Regarding: Expanded Site Inspection Report	240
11	375252	09/19/02	Ohio EPA	Ripley, L., U.S. EPA	Report-Regarding: Expanded Site Inspection	61
12	375248	06/30/03	Tetra Tech EM Inc.	Martin, S., Ohio EPA	Report-Regarding: Final Hydrogeologic Investigation	95
13	440648	10/20/03	Ohio EPA	U.S. EPA	Report-Regarding: Quality Assurance Project Plan for U.S. EPA Region V Superfund Site Investigations	440
14	375257	06/29/06	Tetra Tech EM Inc.	Martin, S., Ohio EPA	Report-Regarding: Final Hydrogeologic Investigation	263
15	375258	09/28/06	Ohio EPA	File	Report-Regarding: Sub-Slab Sample Investigation Information	374
16	375243	10/23/06	U.S. EPA	File	Report-Regarding: (Excerpt) Superfund Chemical Data Matrix (SCDM)	8
17	375254	03/27/07	Ohio EPA	File	Report-Regarding: Soil Gas Survey Information	13
18	375261	03/27/07	Ohio EPA	File	Report-Regarding: Soil Gas Sampling Information	179
19	375272	03/01/08	Ohio EPA	File	Report-Regarding: Milford Well Field Information	1
20	375269	12/07/09	WESTON Solutions, Inc.	File	Telephone Conversation Record Between Lauren Cook of WESTON and Mark Day of Clermont County Water Works Division	2
21	375270	12/30/09	WESTON Solutions, Inc.	File	Telephone Conversation Record Between Lauren Cook of WESTON and Customer Service of Greater Cincinnati Water Works	2
22	375262	02/08/10	Ohio EPA	U.S. EPA	Report-Regarding: Public Well Information	9

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
23	366546	03/30/10	Ohio EPA	U.S. EPA	Report-Regarding: Supplemental Expanded Site Inspection	450
24	375251	07/26/10	Ohio EPA	File	Report-Regarding: 2000 PA/SI Laboratory Data and Field Log Sheets	167
25	633074	10/01/10	U.S. EPA	Public	Report-Regarding: Proposed HRS Documentation Record	42
26	929556	10/19/10	U.S. EPA	Public	News Release – Milford, Ohio Aquifer Site Proposed to be Added to Superfund National Priorities List	1
27	442018	10/21/10	U.S. EPA	File	Federal Register – Proposed Rule #53	8
28	633105	03/01/11	U.S. EPA	Public	NPL- Site Listing Narrative	1
29	929557	03/08/11	U.S. EPA	Public	News Release – EPA Adds 10 Hazardous Waste Sites to Superfund's NPL / 15 Additional Sites Proposed	2
30	390826	03/10/11	U.S. EPA	File	Federal Register – Final Rule 51, Vol. 76 No. 47	9
31	921033	12/01/11	U.S. EPA	Public	EPA Fact Sheet – Contaminated Underground Water Affects City Wells	2
32	921032	01/01/13	U.S. EPA	Public	Community Involvement Plan	27
33	470334	02/21/13	Ohio Department of Health	Cheever, J., U.S. EPA	Report-Regarding: Public Health Assessment (Final Release)	54
34	910497	12/11/13	SulTRAC	Cheever, J., U.S. EPA	Report-Regarding: Quality Assurance Project Plan – Phase I (Signed)	67
35	929558	11/24/14	SulTRAC	U.S. EPA	Report-Regarding: Phase I Field Summary	459
36	553419	02/28/18	SulTRAC	Elkins, J., U.S. EPA	Report-Regarding: Data Validation Report for Phase II Investigation	17

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
37	960641	06/24/19	SulTRAC	Davison, J., U.S. EPA	Report-Regarding: (Redacted) Summary of Vapor Intrusion Investigations	18
38	960508	07/01/20	SulTRAC	U.S. EPA	Report-Regarding: Response to Regulatory Agency Review Comments – Draft Remedial Investigation	17
39	967558	10/28/20	SulTRAC	Anson, R., U.S. EPA	Report-Regarding: Final Remedial Investigation	156
40	961818	10/28/20	SulTRAC	Anson, R., U.S. EPA	Report-Regarding: Final Remedial Investigation Report – (Appendices A-G) Part 2 of 3	724
41	961819	10/28/20	SulTRAC	U.S. EPA	Report-Regarding: Final Remedial Investigation – (Appendix F Data Validation Reports, Zip File) Part 3 of 3	1
42	967559	10/28/20	SulTRAC	U.S. EPA	Report-Regarding: Response to Regulatory Agency Review Comments – Final Remedial Investigation	5
43	968621	02/23/21	Williams, L., Ohio EPA	File	Email-Regarding: Vapor Intrusion	5
44	968622	04/19/21	Williams, L., Ohio EPA	Franc, D., U.S. EPA	Email-Regarding: FS Comments and Acceptance	3
45	967557	04/26/21	SulTRAC	U. S. EPA	Report-Regarding: Final Feasibility Study, Revision 1	148
46	971100	08/12/21	Williams, L., Ohio EPA	Franc, D., U.S. EPA	Email-Regarding: Proposed Plan Comments	5
47	970207	12/01/21	U.S. EPA	Public	EPA Fact Sheet – U.S. Proposes Cleanup Plan for Contaminated Aquifer	8
48	970208	12/08/21	U.S. EPA	Public	U.S. EPA – Proposed Plan	33

REMEDIAL ACTION
ADMINISTRATIVE RECORD
FOR THE
MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT COUNTY, OHIO

UPDATE 1
MARCH 30, 2022
SEMS ID: 975122

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	975115	12/04/21	U.S. EPA	General Public	Tear Sheet Regarding the Proposed Cleanup Plan for the Milford Aquifer Site: Milford Miami Adviser	1
2	975116	12/08/21	U.S. EPA	General Public	Tear Sheet Regarding the Proposed Cleanup Plan for the Milford Aquifer Site: Cincinnati Enquirer	1
3	975117	12/13/21	General Public	U.S. EPA	[Redacted] Public Comment 2 - Questions Regarding U.S. EPA Selected Remedy	1
4	975118	12/15/21	U.S. EPA	General Public	Milford Proposed Plan Virtual Meeting Transcript	28
5	975119	12/30/21	General Public	U.S. EPA	[Redacted] Public Comment 1 Regarding Opinions on the Various Remedial Alternatives and Preferred Alternative	2
6	975120	01/07/22	General Public	U.S. EPA	[Redacted] Public Comment 3 Regarding Preference of Alternative 3	1
7	975121	03/22/22	Ohio EPA	U.S. EPA	Letter Regarding Concurrence of Record of Decision (ROD)	1
8	***	***	***	***	*Record of Decision (ROD) Pending*	***

ATTACHMENT 4:
OHIO ENVIRONMENTAL PROTECTION AGENCY LETTER OF CONCURRENCE

Ohio Environmental Protection Agency

Mike DeWine, Governor
Jon Husted, Lt. Governor
Laurie A. Stevenson, Director

March 22, 2022

Douglas Ballotti, Director
Superfund Division SR-6J
U.S. EPA, Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Re: Milford Well Field Unknown Source Remediation Response
Project records
Remedial Response
Clermont County
513001357006

Subject: Record of Decision Concurrence
Milford Contaminated Aquifer, Milford, Clermont County, Ohio

Dear Mr. Ballotti:

The Ohio Environmental Protection Agency has reviewed the Record of Decision for the Milford Contaminated Aquifer Superfund Site. Ohio EPA concurs with U.S. EPA's selected remedy, which consists of the following components:

> Alternative 2c – In-Situ Treatment – Combined Remedy (exposure pathway elimination, ICs, in-situ treatment via combined approaches near the source area; ground water monitoring):
>
> A pre-design investigation would be conducted to determine the most effective treatment of ground water using a combination of several approaches (to be determined after pre-design investigation) in the presumed source area near Baker Feed and the installation of a permeable reactive barrier located west of the Baker Feed Property.

We look forward to working with U.S. EPA on the successful design and implementation of the selected remedy. If you have any questions concerning the above, please feel free to contact Leslie Williams at (937) 285-6054.

Sincerely,

Laurie A. Stevenson

Laurie A. Stevenson
Director

ec: Bonnie Buthker, DERR/SWDO

Melisa Witherspoon, DERR/CO
Mark Rickrich, DERR/CO
Leslie Williams, DERR/SWDO
Mike Starkey, DERR/SWDO